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# USSR Report

CHEMISTRY



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## USSR REPORT CHEMISTRY

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## ADSORPTION

UDC 678.675'126+678.046.36

### ADSORPTION AND POLYMERIZATION OF $\epsilon$ -CAPROLACTAM ON MONTMORILLONITE SURFACE

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 45, No 6, Nov-Dec 83  
(manuscript received 14 Jun 82) pp 1043-1052

BRYK, M. T., GOYKHMANN, A. Sh., SKOBETS, I. Ye. and OVCHARENKO, F. D.,  
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Sciences, Kiev

[Abstract] X-ray analysis and IR spectroscopy were employed in the analysis of adsorption of  $\epsilon$ -caprolactam (CL) to montmorillonite surfaces modified by various salts and subjected to air-drying and in vacuo thermal treatment. CL was found not to penetrate into the interstices of in vacuo dried (823°K, ca. 133 Pa) montmorillonite, but forms inclusion compounds with K,  $\text{NH}_4$ , Ba

(monolayer) and Li (bilayer) forms. The Cu form did not incorporate CL into all the interstices, while the Mg, Ni, Mn and Al forms of air-dried samples failed to form inclusion compounds with CL. At 538 °K CL polymerizes on the surface of the various montmorillonite samples, and within the interstices of the Mg, Mn and Ni forms that had been air dried. Figures 5; references 15: 2 Ukrainian, 12 Russian, 1 Western.

[104-12172]

UDC 541.183:543.42

### REACTION OF TRIPHENYL METHANOL WITH MONTMORILLONITE

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 45, No 6, Nov-Dec 83  
(manuscript received 18 Jun 82) pp 1167-1170

TARASEVICH, Yu. I. and DOROSHENKO, V. Ye., Institute of Colloid Chemistry and Water Chemistry, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] Electron microscopy, x-ray analysis, and gravimetric methods were used to assess adsorption of triphenyl methanol (TPM) from ethanol solutions on various cationic forms of montmorillonite. TPM was found to adsorb to both the surface and interstitial surfaces, and, in the latter to form a flat monolayer in the Mg and Ca forms of montmorillonite since the thickness of the TPM

molecular has been calculated at 0.57 nm and the interstitial spaces are 0.56-0.63 nm wide. The organization of TPM is less ordered in the interstitial spaces of the K, Na and Li forms, which are 1.28-1.42 nm wide. In vacuo heat treatment (1000°C) of the samples with adsorbed TPM results in the transformation of TPM into  $\text{Ph}_3\text{C}^+$  on reaction with strong Brønsted and Lewis acid centers. Figures 1; references 15 (Russian). [104-12172]

UDC 541.183:546.791

#### PROPERTIES OF THERMOXIDE-5 SORBENT FOR EXTRACTION OF URANIUM

Leningrad RADIOKHIMIYA in Russian Vol 25, No 5, Sep-Oct 83  
(manuscript received 16 Apr 82) pp 572-575

MALYKH, T. G., SHARYGIN, L. M., GONCHAR, V. F., MOISEYEV, V. Ye.,  
KOMAREVSKIY, V. M., MYASOYEDOV, B. F. and NOVIKOV, Yu. P.

[Abstract] Physical-chemical properties of the sorbent Thermoxide-5 (T-5) are described. T-5, based on hydrated titanium dioxide, was synthesized by the sol-gel method. It consists of mechanically strong granules, about 0.6-1.6 mm in diameter. Physical measurements show that T-5 is transiently porous with well-developed specific surface; it is crystalline, with octahedral structure of  $\text{TiO}_2$  modification and slight admixture of rutile. Field studies of T-5 in Caspian Sea showed that it is chemically stable. Due to its selectivity towards uranium and its high mechanical strength, T-5 has been successfully used in extraction of uranium from sea water in pseudoboiling layer. Figures 5; references 17: 12 Russian, 5 Western. [78-7813]

UDC 661.183.12.(088.8)

#### MECHANISM OF URANIUM SORPTION BY PHOSPHINIC ACID ION EXCHANGE RESINS

Leningrad RADIOKHIMIYA in Russian Vol 25, No 5, Sep-Oct 83  
(manuscript received 19 Aug 82; after final revision 15 Feb 83) pp 575-579

FILIPPOV, Ye. A., BAVRIN, V. I., LEYKIN, Yu. A., IL'INSKIY, A. A. and  
ZHAVORONKOVA, T. V.

[Abstract] The process and mechanism of sorption of uranium with monofunctional cation exchange resins was studied. The resins were based on styrene and divinylbenzene copolymers containing various phosphinic acid groups [CF-PAG]:  $\text{CP-P(O)(OH)R}$  where  $\text{R} = \text{OH}$  (CF-5),  $\text{CP-H}$  (CF-3),  $\text{CP-C}_4\text{H}_9$  (CF-B) and  $\text{CP-CH}_2\text{OH}$  (CFM-1) as well as cation exchange resins containing concurrently the phosphino- and phosphono-acid groups. The distribution coefficients of uranium from nitric



acid solution increased in the following order: CF-5<CF-3<CF-B<CFM-1. Cation exchange resins with paired distribution of ionogenic groups within one elemental link created more advantageous conditions for the uranium sorption, because in such cases the coordination of adsorbed uranium occurred within an elemental link and without relaxing the polymer matrix. Figures 3; references:

7 (Russian).

[78-7813]

UDC 54-36.004.14:621.039.324.534

$^{110m}\text{Ag}$  SORPTION WITH METAL OXIDES FROM BORATE SOLUTIONS

Leningrad RADIOKHIMIYA in Russian Vol 25, No 5, Sep-Oct 83

(manuscript received 9 Jul 82; after final submission 23 Nov 82) pp 584-589

AMPELOGOVA, N. I.

[Abstract] The state of  $^{110m}\text{Ag}$  in borate solution was studied along with the regulations governing its adsorption from this solution with iron oxides (hematite, magnetite), chromium and zirconium oxides and with stainless steel corrosion products. Silver sorption with cation or anion exchange resins in water or borate solution is practically identical; in all cases it drops at  $\text{pH} > 8$ . At  $\text{pH} < 8$  the cation form of silver appears to predominate in these media. The sorption process was found to be endothermic; the apparent heat of sorption of  $^{110m}\text{Ag}$  on magnetite was 16.5-18 kJ/mole at  $\text{pH} 8.2$  and 32 kJ/mole at  $\text{pH} 9.6$ . At temperatures exceeding  $100^\circ\text{C}$  the heat of sorption drops. Overall, it was found that the sorption process is irreversible, increases with temperature rise and falls in presence of ammonia; it exhibits ion exchange character complicated with hydrolysis of the cation being adsorbed and chemical reaction between the sorbent and sorbate. Figures 2; references 10: 6 Russian, 4 Western.

[78-7813]

ANALYTICAL CHEMISTRY

UDC 542.61:543.42:546.23

CHEMICAL AND SPECTRAL ANALYSIS OF HIGHLY PURIFIED SELENIUM INVOLVING  
EXTRACTION WITH 1-HEXENE

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 38, No 12, Dec 83  
(manuscript received 31 Dec 82) pp 2193-2197

TORGOV, V. G. DEMIDOVA, M. G., YUDELEVICH, I. G. and ATOMASOVA, T. I.,  
Institute of Inorganic Chemistry, Siberian Department, USSR Academy of Sciences,  
Novosibirsk

[Abstract] A novel method has been devised for the analysis of selenium, which relies on extraction with 1-hexene from HBr solutions. This approach results in the extraction of more than 99.9% of the selenium (0.01-1.2 M) within 1-10 min. Subsequent atomic absorption spectroscopy of the samples resulted in the identification of 35 elements as microimpurities with a lower concentration level of  $5 \times 10^{-5}$  to  $2 \times 10^{-8}$ % and a relative standard deviation of 0.07-0.30. References 12: 9 Russian, 3 Western.  
[119-12172]

UDC 543.544

GAS LIQUID CHROMATOGRAPHY OF PESTICIDES (SURVEY)

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 38, No 12, Dec 83  
(manuscript received 23 Aug 82) pp 2224-2235

CHMIL', V. D., All-Union Scientific Research Institute of Hygiene and  
Toxicology of Pesticides, Polymers and Plastics, Kiev

[Abstract] The general problem of pesticide analysis and quantification by means of gas-liquid chromatography is reviewed. Particular attention is accorded to the problems encountered with pesticides that, by their physical and chemical nature, are not sufficiently volatile or thermally stable to be subjected to this method of analysis. Gas-liquid-chromatography of such compounds requires their chemical transformation into derivatives possessing characteristics that make an analysis by this method possible. The reactions generally employed for pesticides include methylation, halogenation, silylation,

nitration, etc. Such treatment renders the products more volatile and thermostable and, in some cases, decreases adsorption to various surfaces and further enhances the sensitivity of this method. References 183: 23 Russian, 160 Western.  
[119-12172]

UDC 543.4:543.544

#### ATOMIC ABSORPTION SPECTROSCOPY IN CHROMATOGRAPHIC ANALYSIS

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 38, No 12, Dec 83  
(manuscript received 21 Dec 82) pp 2236-2246

BYKHOVSKIY, M. Ya. and BRAUDE, A. Yu., All-Union Scientific Research Institute of Chromatography, Moscow

[Abstract] A literature review is presented of the application of atomic absorption spectroscopy as a selective detector in gas and liquid chromatographic systems. This is particularly useful in the analysis of many petroleum products, biological samples, industrial waste products and pigments which are complex mixtures of substances and resolution of which into the individual components may be very difficult. The use of atomic absorption spectroscopy in such cases eliminates the need for their separation since elements that cannot be detected by this method will not give a chromatographic peak. This offers considerable advantage over standard detectors used in chromatography, such as flame ionization, electron capture, etc. Figures 5; references 59: 6 Russian, 53 Western.  
[119-12172]

UDC 622.02.543.062

#### TRACE ELEMENT COMPOSITION OF COAL HYDROGENATION PRODUCTS

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 6, Nov-Dec 83  
(manuscript received 26 Jul 82) pp 91-94

YEGOROV, A. P., LAKTIONOVA, N. V., TITOVA, T. A. and TSEDEVSUREN, Ts., Institute of Combustible Minerals

[Abstract] Trace element composition of coal from Baganur, Tovan Tolgoy, Sharyngol, Irsha-Borodinsk and Berezovsk deposits and their liquid hydrogenation products was analyzed using the methods developed at the Institute of Combustible Minerals (ICM). In liquid hydrogenation products the contents of trace elements was lower than in the starting coal by one order of magnitude; the principal mass of these elements was retained in solid residues after hydrogenation. In comparison to other petroleum products of the USSR, liquid hydrogenation products contained higher levels of Ba, much lower levels of Va and about the same percentages of Pb, Ni, Co, Cu, Mn and Ga. The results of analysis by ICM methodology compared well with results obtained by other methods. References 11: 9 Russian, 2 Western.  
[92-7813]

## EXTRACTION SEPARATION OF SOME RARE EARTH ELEMENTS WITH CHLOROFORM SOLUTION OF DIANTIPYRYLMETHANE IN PRESENCE OF PERCHLORATE IONS

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 49, No 11, Nov 83  
(manuscript received 18 Apr 83) pp 1189-1192

PYATNITSKIY, I. V., GAVRILOVA, E. F. and MAKARCHUK, T. L., Kiev State  
University imeni T. G. Shevchenko

[Abstract] The goal of the present study was to evaluate the possibility of extractive separation of some rare earth elements (REE) from mixtures of these REE based on previously obtained data on extraction of lanthanides in the system REE-diantipyrylmethane (DAM)-CCl<sub>4</sub>. The following elements were studied:

lanthanum, praseodymium-cerium group, gallium, ytterbium and lutecium-yttrium group. In preliminary tests it was established that with DAM concentration of 0.02 M, lutecium and ytterbium were practically quantitatively extracted, while lanthanum and praseodymium were not. To increase further the selectivity of the system, masking ligands were introduced: tartaric acid, citric acid and F<sup>-</sup> ion. Experimental data indicated that the fluoride ion used as masking agent could possibly facilitate separation of lanthanum-lutecium mixtures in a 1:10 ratio. Figures 3; references 7 (Russian).

[79-7813]

UDC 541.138.2:542.97

BIOELECTROCATALYSIS: ENZYME ELECTRODES

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA in Russian No 6, Nov-Dec 83  
(manuscript received 14 Jun 82) pp 523-535

YAROLOV, A. I., KARYAKIN, A. A. and VARFOLOMEYEV, S. D.,  
Section of Biokinetics, Chair of Enzymology

[Abstract] One of the byproducts of immobilized enzyme technology was the development of enzyme electrodes, a review of the essential features of which is here provided, covering primarily the underlying electrochemical principles and applications, as well as kinetics. Electron tunneling has been advanced as an attractive mechanism to account for electron transfer between the active site of the enzyme and the electrode, i.e., as a coupling mechanism. In addition, the use of conductor and semiconductor matrices for the immobilized enzymes has been proposed as a means of electron transfer. Hydrogen electrodes have been prepared in which immobilized hydrogenases are used to oxidize hydrogen, and oxygen electrodes have been designed which use immobilized laccases for the electro-reduction of oxygen. Figures 6; references 32: 21 Russian, 11 Western.  
[114-12172]

UDC 541.183:532.64:537.228.1

PIEZOELECTRIC MICROGRAVIMETRIC ANALYSIS OF PROTEIN ADSORPTION ON SOLIDS

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA in Russian No 6, Nov-Dec 83  
(manuscript received 30 May 83) pp 580-584

MALINOVSKAYA, L. M., GORYUNOV, Yu. V. and IZMAYLOVA, V. N., Chair of  
Colloid Chemistry

[Abstract] Piezoelectric microgravimetric method was employed in the study of adsorption of gelatin and human serum albumin on standard silver electrodes and on electrodes coated with polypropylene and  $(\text{SiO}_2)_n$  films. The weight of the adsorbed protein was determined from the change in the frequency of the piezoelement over a range of 5-35°C. The data obtained by the piezoelectric microgravimetric data were comparable with standard wet methods; the latter



allowed determination of the fraction of hydrophobic and hydrophilic sites on the adsorbed surface and showed that gelatin functions as a more powerful modifying agent than human serum albumin. References 10: 8 Russian, 2 Western. [114-12172]

UDC 66.067.5

#### SWING CENTRIFUGES FOR MEDICINAL AND CHEMICAL PRODUCTION

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 11, Nov 83 pp 15-16

NAPALKOVA, M. F., PETROV, V. Ye., ZAMOTAYLOV, V. V. and CHERNYSH, V. P., engineers

[Abstract] Various types of swing centrifuges are said to be widely used in medical and chemical industry. Their principal characteristics include simple construction, dynamic stability, ease of rinsing and washing precipitated material and high degree of dehydration. They can be placed in any desired spot and need no special foundation bases. The technical characteristics of three of these centrifuges are tabulated. Their protective covers make it possible to use them on explosive sites. In designing these centrifuges considerable attention has been paid to safe performance of these machines and improved servicing. Many safety measures have been introduced. These machines are evaluated continuously and modified to correct newly discovered shortcomings. Figures 2. [90-7813]

UDC 663.14.033.84

#### NOVEL SEPARATORS FOR MICROBIOLOGICAL AND ALCOHOL INDUSTRY

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 11, Nov 83 pp 16-17

SMIRNOV, A. V., DANILOVA, N. K., RYABOV, M. N. and KOROLEV, A. S., engineers

[Abstract] Novel separators-coagulators have been developed for microbiological, alcohol and food industry. By increasing the diameter of the rotor, productivity has been enhanced. Replaceable elements were introduced at points subject to wear so as to improve safety and rapid servicing. The machines have been hermetically sealed and a stronger electric motor introduced. On the basis of evaluation performed, serial production was recommended for separators SDS-531K-01 and SDS-531T-01 which should lead to savings of 10-11,000 rubles per machine/year. Figure 1. [90-7813]

INDUSTRIAL UTILIZATION OF HYDROCYCLONES

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 11, Nov 83  
pp 17-18

VAYDUKOV, V. A. and PRILUTSKIY, Ya. Kh., engineers

[Abstract] In recent years a series of new hydrocyclones was designed for non-ferrous metallurgy, chemical and biochemical industry and for separation of suspensions in general: hydrocyclones with drum separation of the precipitate equipped with pulsating device and hydrocyclones for washing and rinsing. Lately, hydrocyclones began to be used instead of centrifuges and filters to wash solid phase of various suspensions. Cascade hydrocyclones are capable of countercurrent washing of concentrated phases directly in the hydrocyclone. Refinement of hydrocyclones made them adaptable to other operations: purification of sewage, removal of emulsified water from petrochemicals, protection of equipment from abrasive materials, etc. New hydrocyclones were constructed from nonmetallic materials to expand their use even more.

[90-7813]

## CATALYSIS

UDC 662.733.092

### SYNTHESIS OF BIMETALLIC CATALYST WITH CARRIER MADE FROM MODIFIED PEAT

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 11, Nov 83  
(manuscript received 24 Mar 82) pp 2452-2455

BEL'KEVICH, P. I., GAYDUK, K. A., TRUBILKO, E. V., BEL'SKAYA, R. I. and  
BEREZOVNIK, G. K.

[Abstract] A method of producing a bimetallic catalyst based on peat by two-stage thermolysis with the use of copper and cobalt as an active phase is described and discussed. Variable factors considered included the degree of decomposition of the peat, the temperature of the second stage of synthesis and the temperature of the dehydrogenation reaction. The cyclohexanone yield and the selectivity of the dehydrogenation process were used as parameters of optimization. Increase of temperature of stage 2 of thermolysis increased both the cyclohexanone yield and the selectivity of the dehydrogenation process. Increase of the degree of decomposition of the initial peat impaired the selectivity of the dehydrogenation process. The synthesized bimetallic Co-Cu-carbon catalyst possessed high stability and selectivity of the process and produced a high yield of cyclohexanone. The high thermostability of the catalyst makes possible operation at 300° with high volumetric rates of feed of the initial substance. Figures 2; references 8: 6 Russian, 2 Western.  
[102-2791]

UDC 523.7:546.46

### PHOSPHINE OXIDATION WITH OXYGEN IN PRESENCE OF IODIDE IONS CATALYZED WITH DEPOSITED COPPER CHLORIDE COMPLEXES (II)

Ivanovo IZVESTIYA VYSSHIKH UCHEBNIKH ZAVEDENIY: KHIMIYA I KHIMICHESKAYA  
TEKHNOLOGIYA in Russian Vol 26, No 11, Nov 83  
(manuscript received 10 Feb 82) pp 1334-1338

RAKITSKAYA, T. L. and ABRAMOVA, N. N., Chair of Chemical Methods of Environmental Protection, Odessa State University imeni I. I. Mechnikov

[Abstract] The goal of the present study was to evaluate catalytic properties of copper chloride (II) complexes deposited on silica gel MSM in presence of iodide ions and to compare their activity with that of the soluble complexes

in the oxidation of phosphine with oxygen. On the basis of kinetic and potentiometric measurements, a reaction mechanism was proposed which provided for reduction of copper (II) with phosphine and oxidation of copper (I) with oxygen. Kinetic and thermodynamic constants were calculated for the most active catalysts:  $\text{CuCl}_2$  and  $\text{CuCl}_3^-$ . Comparison of thermodynamic and kinetic constants of the deposited and soluble copper (II) chloride complexes showed a dose relationship indicating identical composition and analogous properties of these complexes in phosphine oxidation with oxygen. Figures 2; references 13: 9 Russian, 4 Western.  
[105-7813]

UDC 539.124.6

#### POSITRON ANNIHILATION IN $\text{Pd}/\text{Al}_2\text{O}_3$ CATALYSTS

Moscow KHIMICHESKAYA FIZIKA in Russian No 11, Nov 83  
(manuscript received 31 May 82) pp 1573-1576

DEKHTYAR, I. Ya., SAGOV, Yu. M. and FEDCHENKO, R. G., Institute of Metallophysics, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] The method of electron-positron annihilation was used to study the catalytic properties of palladium applied to a dielectric substrate consisting of dispersed  $\text{Al}_2\text{O}_3$  particles. The plots of the angular distribution of annihilation photons showed a narrow component due to positron formation, with the relative intensity of the positron peak diminishing proportionately as a concentration of palladium increased to a limit of 1 mass%. A further increase in the palladium content had no effect on positron peak intensity ( $S_{ps}/S$  0.17). This degree of plating constituted an optimum palladium concentration which excludes a given proportion of the surface area of  $\text{Al}_2\text{O}_3$  from reacting with palladium. Figures 2; references 8 (Russian)  
[118-12172]

UDC 541.128:542.943.7

#### COMPARATIVE CATALYTIC EFFICIENCY OF ALKALI, ALKALINE EARTH AND RARE EARTH ELEMENTS IN OXIDATION OF ETHYLBENZENE TO HYDROPEROXIDE

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 2, 1983 pp 6-10

MIRIANASHVILI, V. M. and SEREBRYAKOV, B. R., All-Union Scientific Research Institute 'Olefin'

[Abstract] Comparative studies were conducted on the catalytic efficiency of a number of alkali, alkaline earth and rare earth elements in promoting oxidation of ethylbenzene to hydroperoxide, as well as on the effectiveness of

certain inorganic and organic sodium compounds. Naphthenates of the alkali metals (Li, Na, K), alkaline earths (Ba, Ca, Sr) and rare earths (La, Pr, Sm, Nd) were found to be quite similar under atmospheric pressure and 130°C in catalyzing ethylbenzene oxidation. In the case of alkali metal naphthenates the rate of the reaction was in the 0.11-0.12 moles/liter/h range, with a selectivity of 87.5-89.5%; the corresponding figures for the alkaline earth naphthenates were  $0.3-1.5 \times 10^{-3}$  moles/liter/h and 85.5-88.0%, and for the rare earth compounds  $0.09-0.1 \times 10^{-3}$  moles/liter/h and 80-85%. Sodium carbonate and hydroxide did not differ markedly from sodium salts, organic acids, alcoholates and etherates in terms of catalytic activity. Figures 2; references 5 (Russian).  
[113-12172]

UDC 547.537:547.3

$AlCl_3$ -HCl-TOLUENE CATALYZED ALKYLATION OF BENZENE BY LOW MOLECULAR WEIGHT  $\alpha$ -OLEFINS

Baku AZERBAYDZHANSKIY KHMICHESKIY ZHURNAL in Russian No 2, 1983 pp 21-23

MAGERRAMOV, M. N., USUBOVA, E. N., FARKHADOVA, S. M. and FARADZHEVA, E. Z., Azerbaijan State University imeni S. M. Kirov

[Abstract] Determinations were made of the optimal conditions for the alkylation of benzene by  $C_6$ - $C_{18}$   $\alpha$ -olefins, using  $AlCl_3$ -HCl-toluene to catalyze the reactions. Under optimum conditions the yield of mono- and dialkylbenzenes was in the range of 94-98%. The experimentally-determined optimum conditions for the alkylation consisted of a 5:1 benzene-to-olefin molar ratio, 3 g catalytic complex, and a reaction time of 1.5 h at 50°C. References 7: 5 Russian, 1 Korean, 1 Western.  
[113-12172]

UDC 541.128:542.91:547.21

CO BASED SYNTHESIS OF HYDROCARBONS IN PRESENCE OF Co-CATALYSTS

Moscow KHIIMIYA TVERDOGO TOPLIVA in Russian No 6, Nov-Dec 83  
(manuscript received 16 May 83) pp 7-10

LAPIDUS, A. L., KHOANG, CHONG IYEM, KRYLOVA, A. Yu., KONDRAT'YEV, L. T. and MINACHEV, Kh. M., Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences

[Abstract] In studying methods for production of motor fuels from coal, shale oil and natural gas, attention was directed to the Fischer-Tropsch reaction and to hydropolymerization of olefines, especially to the effect of carriers on the activity of Co-catalysts. The catalysts were obtained by saturating the



carrier (silica gel, aluminum silicate or zeolite) with aqueous solution of cobalt nitrate or n-hexane solution of cobalt carbonyl followed by treatment with hydrogen. The carriers appeared not to have any effect on the yield of products but did affect the composition of hydrocarbons obtained. Catalysts deposited on silica gel or aluminum silicate were active in hydrocarbon synthesis from CO and H<sub>2</sub>. In hydropolymerization of ethylene, active contacts were based on zeolite HY and pentasil. A 5-12% yield of aromatic compounds was obtained in both reactions. In general, using these Co-catalysts made it possible to obtain hydrocarbon mixtures with compositions similar to motor fuels. References 6 (Russian).  
[92-7813]

UDC 546.92-44+541.128

#### STABILITY OF ALUMINUM-PLATINUM CATALYST IN HEPTANE CONVERSION

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 11, Nov 83 pp 9-11

SAVOSTIN, Yu. A., KOZHEVNIKOVA, N. G. and SAVOSTINA, N. V., Special Design and Technologic Office of Catalysts, Institute of Catalysis, Siberian Department, USSR Academy of Sciences

[Abstract] Ability to regulate selectivity for coke formation was studied along with stability of the catalyst in n-heptane conversion based on variation of hydrogenation-dehydrogenation function of aluminum-platinum catalyst created by a number of additives. The stability of catalysts was determined by the quantity of aromatic compounds formed and by n-heptane converted during a given time period. Selectivity was determined by the ratio of coke to aromatic materials formed in one experimental cycle. Data obtained in these experiments agreed with those obtained in cyclohexane conversion at atmospheric pressure and 300°C. There are definite ways of regulating catalyst selectivity for hydrocarbon conversions in reactions leading to formation of carboides as well as in regulating the deactivation rate caused by the coking of catalyst surface. Figures 2; references 10: 8 Russian, 2 Western (1 by Russian authors).  
[89-7813]

UDC [665.644.2.097.3:661.183.6]:543

#### STABILITY OF TSEOKAR TYPE CRACKING CATALYST

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 11, Nov 83 pp 11-12

ZINOV'YEV, V. R. and BRYZGALINA, L. V., Grozny Scientific Research Institute

[Abstract] Catalytic stability of pellet catalysts Tseokar-2 and Tseokar-4 was studied under production conditions, processing heavy crude oil from low sulfur paraffins. During the study the catalysts performed for a period of 9-18 months without regeneration. On the basis of end results obtained, these catalysts exhibited high stability of physical and catalytic properties. Tseokar-4 was more stable than Tseokar-2 with respect to oxidative stability. It was recommended that the use of Tseokar-4 be expanded in industrial production and in cracking operations using heavy crude oil with low sulfur content. References 6 (Russian).  
[89-7813]

CHEMICAL INDUSTRY

SCIENTIFIC AND TECHNOLOGICAL COLLABORATION AGREEMENT BETWEEN USSR AND FRG

Tashkent PRAVDA VOSTOKA in Russian 28 Oct 83 p 2

[Article: "Prospects for Collaboration" from Uzbek News Agency]

[Text] The 11th meeting in Tashkent of the expert chemistry group of the USSR and FRG commission for economic and scientific-technological collaboration ended on 27 October with the joint endorsement of the minutes. The delegations of these two countries outlined a program for further development of contacts in the area of license exchange, introduction of promising technologies for production of plastics, mineral fertilizers and chemicals for protection of plants.

L. N. Osipenko, first deputy minister of the USSR Chemical Industry, chief of the Soviet delegation, announced: "Contacts between Soviet and West German chemists have existed for 11 years now within the limits of the long-term program for collaboration of our countries in the area of economics and industry." The mutually advantageous ties are expanding. Joint work was outlined during the meetings of USSR and FRG chemists in the area of agricultural production, environmental protection, joint construction and reconstruction of large chemical enterprises.

The participants at the meeting were received by the Uzbek Council of Ministers.

10,657  
CSO: 1841/59

UDC 662.741.3.022:622.765.004.82:66.047.59.096.5

DRYING AND GRANULATING COAL FLOTATION WASTES IN FLUIDIZED BED

Moscow KOKS I KHIMIYA in Russian No 12, Dec 83 pp 47-49

RUBIN, Yu. M., GAVRIK, N. V., LYAKH, N. F., (Ukrainian Scientific Research Coal Concentration Institute), KHVASTUKHIN, Yu. I., PETISHKIN, A. A. and KOGUTA, N. K., UkSSR Academy of Sciences Gas Institute

[Abstract] Results of a study of the process of granulating watery coal flotation wastes in a fluidized bed with the use of a prolonged continuous-action, high-productivity device are presented and discussed. Technological parameters and design decisions which ensure stability of the granulation process are determined, described and discussed. Two methods of operation were found to be equally effective. Dust produced (particle size  $<1$  mm) and humidity 1 to 3 percent may be used independently (plugging boreholes, burning in coal dust furnaces). A process for granulating the dust is described. It produces granules with coarseness 40 to 50 percent less than 5 mm, 40 to 45 percent less than 5 to 10 mm and 5 to 15 percent greater than 10 mm. The experimental device is illustrated and the method of operation is described. References 3 Russian.

[98-2791]

UDC 542.97+66.097+661.721

CATALYTIC AND SURFACE PROPERTIES OF COPPER OXIDE-ZINC OXIDE BINARY SYSTEM

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 49, No 11, Nov 83  
(manuscript received 28 Sep 82, after revision 16 Apr 83) pp 1174-1177

BONDAR', P. G., ATROSHCHENKO, A. V., BARKOV, A. P., BORISOVA, L. F., GOROSHKO, GOROSHKO, O. N., DIVENKO, A. P., ZAVADSKAYA, A. S., MARKOVA, A. S., RYZHAK, I. A. and SHAGINA, N. A., Gosniimetanolproyekt State Scientific Research Institute of Methanol Projects [?] Severodonetsk

[Abstract] The structure and properties of the system of  $\text{CuO-ZnO}$  was studied;  $\text{Cu}(\text{NO}_3)_2$  was excluded from its preparation. Specific surface of calcined samples of this binary system was considerably higher than specific surfaces of its individual components. Increase of total content of  $\text{CuO}$  in starting

samples led to marked increase in the activity. In general, as the content of CuO was increased up to 50% (and along with it the surface of copper), the number of active centers increased. Figures 2; references 8: 6 Russian, 2 Western.  
[79-7813]

UDC 621.575.9:661.834

#### DESIGN AND USE FEATURES OF ABSORPTION LITHIUM BROMIDE COOLERS

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 12, Dec 83  
pp 6-9

SHMUYLOV, N. G., candidate of technical sciences and ROZENFEL'D, L. M.,  
doctor of technical sciences

[Abstract] Mass production of absorption lithium bromide coolers at the "Penzkhimmash" Scientific Production Association with 1.1, 3 and 5.8 MWT capacity makes it possible to obtain water at 7°C using 90-120°C water or steam at up to 0.17 MPa. The coolers have made significant economic and energy savings possible, and some 280 systems have been installed producing 820 MWT of cooling capacity at industrial plants. A diagram and description of the system are presented. Deep vacuum (0.8-1.3 kPa) and mean cooling-agent volume, as well as severe loss of efficiency if air is introduced and significant corrosion problems, characterize the equipment. Work continues to enhance positive parameters and eliminate these problems. The submerged generator causes losses through hydrostatic pressure of the liquid column and overheating of lower strata of the liquid. An adiabatic isobar absorption process permits intensification of heat and mass transfer and thus reduces losses. Preventing corrosion of high-carbon steel tubing requires scarce cupronickel or copper. Modifications of the system are being used to provide cooling using high-temperature energy sources at enterprises requiring large amounts of cooling capacity during certain seasons of the year. Various heat sources, water supplies and cold air applications can readily be accommodated. Thermal coefficients determine the practicality of using the equipment described, taking available cooling surface and temperature differentials into account. Figures 2; references 3 Russian.  
[109-12131]

# USING ABSORPTION HEAT PUMPS TO UTILIZE LOW-POTENTIAL SECONDARY THERMAL ENERGY RESOURCES

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 12, Dec 83  
pp 9-11

YANKOV, V. S. and KHOSHTARIYA, A. G., candidates of technical sciences

[Abstract] Utilization of secondary energy resources is basic to conserving thermal energy. The present study reports on extracting heat from return water at industrial plants, which consume 55% of all energy and which waste heat in simple heat radiation into the atmosphere from low-potential sources such as return water. Steam compression and absorption heat pumps were used to heat makeup water of water-softening and hot water supply installations. Mass produced lithium bromide coolers of 3.02 MWT capacity were able to heat water to 65-80°C using water at 160-180°C or steam at 0.5-0.8 MPa as the energy source. A schematic diagram of the ABKhA-2500 heat pump used is given and outlined. Its effectiveness compared favorably to steam boiler + cooling tower systems. Figures 2.

[109-12131]

# PROSPECTS FOR USING SOLAR ENERGY TO PRODUCE SEASONAL REFRIGERATION

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 12,  
Dec 83 pp 12-14

GROSMAN, E. R., candidate of technical sciences

[Abstract] The present report tells of prospects for solar energy from collector panels and heliocooling devices, particularly in Central Asia, the Trans-Caucasus and the southern Ukraine, where average solar intensity is 1500-2000 KWH/m<sup>2</sup>. Absorption lithium bromide systems are being developed for cooling and hot water production during the months of high solar intensity. Where both purposes can be fulfilled, they are regarded to be cost effective now, but further advances, such as reducing the temperature of solar heating devices, are needed. Research at the Institute of Technical Thermal Physics, UkSSR Academy of Sciences, and the Physicotechnical Institute of the TuSSR Academy of Sciences, are working on absorbent regeneration by vaporization and air desorption to improve efficiency. A glass cover to protect the helio-absorptive film is being tested, with air flow either by fans or by natural draft. This system is diagrammed and described. It requires qualified servicing personnel. Devices that operate periodically also offer promise for water heating and cooling applications, with special effectiveness anticipated for ones using methanol as the cooling liquid. Figure 1, references 5:

4 Russian, 1 Western.

[109-12131]



NOVEL TECHNOLOGY FOR PRODUCTION OF ROTORS FOR CENTRIFUGAL SEPARATORS MADE OF PLASTICS

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 11, Nov 83  
pp 29-31

BELINSKIY, A. L., candidate of technical sciences, GUSAKOV, B. F., engineer and KUTEPOV, S. M. And RACHKOV, V. I., candidates of technical sciences

[Abstract] Intensification of technological processes in chemical, food and other industries put new demands on the strength of centrifugal separators. Attempts to use strong nonplastic steel for this purpose led to development of brittle defects; therefore, it has been necessary to turn to more plastic corrosion-resistant steel. New thermomechanical treatments of steel and alloys have been developed to expand the variety of materials which could be used in construction of such separators. The new technology could be applied to other materials, including plastic titanium alloys. Figures 2; references 3 (Russian).  
[90-7813]

UDC 66.02-761:678.4  
66.02-761:678.83

DESIGN AND CONSTRUCTION CHARACTERISTICS OF EQUIPMENT WITH PROTECTIVE COVERS

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 11, Nov 83  
pp 36-38

BUBNOV, V. A., candidate of technical sciences

[Abstract] Considerable experience has been accumulated in chemical and petroleum machine construction in designing and production of units equipped with chemically stable protective covers. Most often rubberized covers are applied on machine details based on various resin mixtures from natural and synthetic rubbers. Natural rubber and butadiene-based materials show better properties than resins from butadiene-styrene, methylstyrene or ethylene-propylene rubbers. Several construction characteristics peculiar to this application along with limitations are discussed. Some of the crucial factors to be considered in such equipment are the welding seam, temperature, pressure and operational medium as well as centrifugal forces. So far there are no solid data for selection of a given thickness of rubberized materials for particular application. Figures 2; references 3 (Russian).  
[90-7813]

TREATMENT OF EFFLUENTS AT NIZHNIY TAGIL METALLURGICAL PLANT

Moscow KOKS I KHIMIYA in Russian No 12, Dec 83 pp 45-47

KUDRYASHOVA, R. I., NEBOL'SINA, L. A., SHCHIPANOVA, Z. L., GADALINA, V. I.,  
(Ural Polytechnical Institute imeni S. M. Kirov), SAPEGIN, A. N. and  
GRIGOROVA, G. I., Nizhniy Tagil Metallurgical Plant

[Abstract] Samples were taken from 11 points of the NTMP biochemical treatment system in June-July and January-February in order to study changes in the level of basic pollutants and the effect of mixing on the effectiveness of the treatment system. The aeration-mixer and high activity of the phenol-reducing culture provided adequate removal of phenol from the water. KhPK reduction was 40-70 percent along the extent of the system and it was one to two times higher in the section operating as an airtank-mixer than it was in culverts III and IV. The system was ineffective with respect to removal of rhodanides and cyanides from the effluent, with no removal of cyanides in many cases. The pH of the water entering the system was at the upper region of the biological optimum. It was reduced in the first culvert (due to oxidation of phenols) and then it was increased. There was a smooth temperature reduction along the extent of the system. The mixer in the first culvert improves removal of phenols, reduces the KhPK and the temperature of the process. Figures 2; references 7: 6 Russian, 1 Western.  
[98-2791]

## COAL GASIFICATION

UDC 553.983

### COMPOSITION AND PROPERTIES OF ORGANIC AND MINERAL FRACTIONS OF SHALE OIL FROM TUROVSK DEPOSITS IN BSSR

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 6, Nov-Dec 83  
(manuscript received 1 Jun 82) pp 17-21

GOR'KIY, Yu. I., LUK'YANOVA, Z. K., MAKEYEVA, G. P. and YURKEVICH, Ye. A.,  
Peat Moss Institute, BSSR Academy of Sciences

[Abstract] Study of the composition and properties of organic and mineral fractions of shale oil provides important information about most effective methods for their processing. In the present paper, shale oil from Turovsk deposits was studied by spectral, bituminological and thermal analyses. All of these methods showed a heterogeneous composition of both organic and mineral fractions: the content of carbonates, ash, sulfur, carbon and oxygen varied extensively. These findings should be considered when designing effective technological procedures for their thermal breakdown. Figures 3; references 6 (Russian).  
[92-7813]

UDC 66:094.3.547.481.543.554

### MOLECULAR OXYGEN OXIDATION OF SHALE OIL CONCENTRATES FROM BULGARIAN DEPOSITS

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 6, Nov-Dec 83  
(manuscript received 4 Mar 82) pp 53-60

BUDINOVA, T. K., ANGELOVA, G. K. and IVANOV, S. K., Institute of Organic Chemistry, Bulgarian Academy of Sciences

[Abstract] Oxidation at relatively low temperature of shale oil from Bulgarian deposits in Krasava and Borov Dol was studied to determine their structure, degree of oxidation with molecular oxygen and the kinetics of this process. The oxidation process showed three characteristic stages: a rapid initial phase, an intermediate stage with gradually diminishing oxidation rate and a final steady state phase. The initial oxidation rates were dependent on the surface of the test samples. Stationary rates of the later stages were independent of the specific surface. This showed that the oxidation process

begins on the surface and only then spreads through the rest of the sample. The oxidation rates did not depend on pretreatment of specimens with HCl or HF. Figures 6; references 12: 10 Russian, 2 Western.  
[92-7813]

UDC 542.943

#### PYROLYSIS OF LIGNITE UNDER CONDITIONS OF LIMITED OXYGEN ACCESS

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 6, Nov-Dec 83  
(manuscript received 22 Feb 82) pp 61-66

SARANCHUK, V. I., BUTUZOVA, L. F., BURAVTSOVA, O. A. and SHENDRIK, T. G.,  
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[Abstract] The effect of the pyrolysis atmosphere on the yield of products and on the processes taking place in solid phase was studied. Pyrolysis of lignite in the temperature range 500-600°C and with limited access of oxygen led to increased removal rate of active oxygen from the solid phase, as compared to the removal of hydrogen. Introduction of limited quantities of oxygen (up to 2 ml/g of coal) altered the distribution of carbon among various products. The extent of thermooxidative destruction expressed by total quantity of liquid and gaseous products increased from 25.9 to 49.2%. Presence of oxygen in the atmosphere of lignite pyrolysis led to increased yields of liquid and gaseous products. Charging the reaction with a given quantity of oxygen could lead to possible changes in the reaction rates of various reactions taking place. Figures 3; references 7: 6 Russian, 1 Western.  
[92-7813]

#### THERMAL DISSOLUTION OF LIGNITE AND COAL WITH ADDITION OF NATURAL AND SILICON ORGANIC COMPOUNDS

Moscow KHIMIYA TVERDOGO TOPLIVA in Russian No 6, Nov-Dec 83  
(manuscript received 21 Jun 82) pp 86-90

VOL'-EPSHTEYN, A. B., GORLOV, Ye. G., SHATAYEVA, T. A. and SHPIL'BERG, M. B.,  
Institute of Combustible Minerals

[Abstract] Thermal dissolution of coal is one of the more promising methods for production of liquid fuels. The process consists of heating pulverized coal in form of a paste with solvent and a hydrogen donor under pressure, at 683-703 K. Under these conditions coal fragments go into solution and upon cracking form gas and various oils. In the present work the effect of the addition of natural products with different content of sulfur was studied. Lignite from the Kansk-Achinsk basin and coal from the Mokhovsk area of the Kuzbass were used in these studies. Addition of natural compounds and their mixtures with octamethylcyclotetrasiloxane lowered formation of gaseous

materials and increased dissolution of organic mass. High content of sulfur led to lower gas formation and lower dissolution. A conclusion was reached that some of these natural products and siliconorganic compounds are good sources of free radicals which initiate some of these reactions leading to gas formation as well as to crosslinking of liquid products. References 6: 4 Russian, 2 Western.  
[92-7813]



STRUCTURE OF PLANAR FLAME OF PERCHLORIC ACID-AMMONIA MIXTURE AND KINETICS OF  
ELEMENTARY CHEMICAL REACTION IN FLAME

Moscow KHIMICHESKAYA FIZIKA in Russian No 11, Nov 83  
(manuscript received 17 Dec 82) pp 1585-1590

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[Abstract] Mass spectrometry was employed in studies on the structure of  
an argon planar flame of perchloric acid-ammonia mixture ( $p = 19$  torr) by  
measuring the concentration distribution of the stable components ( $\text{HClO}_4$ ,  $\text{NH}_3$ ,  
 $\text{HCl}$ ,  $\text{O}_2$ ,  $\text{H}_2\text{O}$ ,  $\text{Ar}$ ,  $\text{NO}_2$ ,  $\text{ClO}_2$ ,  $\text{N}_2$ ,  $\text{N}_2\text{O}$ ,  $\text{NO}$ ) and the flame temperature. Analysis  
of the multi-stage process of the chemical reaction mechanisms in the flame  
and calculations of the concentration profiles demonstrated that the following  
active particles were present in highest concentrations:  $\text{ClO}$ ,  $\text{HNO}$ ,  $\text{Cl}$ ,  $\text{OH}$ ,  $\text{NH}_2$   
and  $\text{HO}_2$ . A scheme is presented of the 15 most important reaction stages  
occurring in the flame in conjunction with the appropriate reaction rates.  
Figures 3; references 16: 10 Russian, 6 Western.  
[118-12172]

## FERTILIZERS

### NOVOMOSKOVSK NITROGEN FACILITY JUBILEE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 23 Dec 83 p 1

[Article by E. Mokhorov (Novomoskovsk): "A Gift for the Jubilee"]

[Text] The Novomoskovsk Order of Lenin and Order of Labor Red Banner Azot Production Association fulfilled the year's plan in all technical-economic indicators ahead of schedule. Above-plan output worth more than 7 million rubles were sold. Some 73,000 tons of mineral fertilizers and 9,000 tons of ammonia were produced over and above the plan since the start of the year. Half of all the output bore the state Emblem of Quality.

The chemical workers' labor triumph coincided with a major event in the life of the enterprise. Today the Novomoskovsk Azot Association celebrates its 50th anniversary. The Bobriki Energy-Chemical Combine, one of the shock projects of the First Five-Year Plan, went into operation in late December 1933. The famous Bobriki went down in the annals of socialist industrialization along with the legendary Magnitka, Dneproges, Kuznetskstroy, and Komsomol'-on-Amur. At the ceremonies opening the combine a fiery speech was delivered by Sergo Ordzhonikidze, the people's commissar of industry.

Sergey Timonin, Nikolay Krinov, and Semen Badeykin were young men when they came to Bobrikstroy. They remember the shovels, wheelbarrows, and barracks of "dig-city." In those days the whole country knew about their heroic exploits. The glorious heroes of the First Five-Year Plan are still working in the shops of their home enterprise. Labor dynasties of Prokoshins, Gladkiys, Serezhkins, Tyunins, Dmitriyevs, and Kabanovs--generation after generation the nitrogen workers of Novomoskovsk created the glory of their home town and enterprise. Since the outfit went into operation, the collective has turned out 65 million tons of mineral fertilizer and made a substantial contribution to the development of the country's agriculture. There are a number of noteworthy dates and events in its history, of which they are especially proud. In the 1960s the Novomoskovsk chemical workers were the first in the country to convert the production of ammonia and mineral fertilizer to natural gas instead of coke. It was a daring engineering decision, a genuine technical revolution in the nitrogen industry. A fundamental breakthrough in the technology of the chemical industry was accomplished by large-tonnage units. And, again, the first in the country to blaze the trail to the mastery of gigantic complexes for the production of ammonia, carbamide, and weak nitric acid were the chemical workers of Novomoskovsk.

In 1968 the Azot Association Collective converted to the Shchekino method. In 15 years since the start of the experiment, the enterprise has provisionally released more than 3,000 workers. As a result of combining jobs, more and more new facilities were put into production during the 8th, 9th, 10th and 11th five-year plans without additional cadre recruitment. Without increasing the number of personnel, the association increased production volumes by a factor of 2.5.

By the date of its jubilee, the enterprise completed 3-year targets with respect to production volume, sales, and profits and doubled planned growth rates of labor productivity.

12255

CSO: 1841/115

## AMMOFOS PRODUCTION TARGETS APPROVED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Jan 84 p 1

[Unattributed report: "Socialist Obligations of the Collective of the Cherepovets Ammofos Production Association for 1984"]

[Text] Implementing the decisions of the 26th CPSU Congress, the workers of the Cherepovets Ammofos Production Association successfully completed the first 3 years of the five-year plan. In 1983, they produced an additional 24,000 tons of mineral fertilizer and 15,000 tons of sulfuric acid. They surpassed labor productivity growth targets by 2.1 percent. All contract obligations were fulfilled.

In endorsement of the decisions of the December 1983 CPSU Central Committee Plenum and the statements and conclusions concerning the main directions in the further development of the national economy presented in the speech of Comrade Yu. V. Andropov, the association's collective launched socialist competition for overfulfillment of planned targets in 1984.

On the basis of further enhancement of effectiveness in production, the modeling of technological shops using scientific and technological advances, and better organization of work, the collective pledged to achieve a 1.2-percent rise in labor productivity above the plan, a 0.6-percent reduction in the prime cost, and an additional 500,000 rubles in profits; to utilize all forms of resources thriftily to save 1 million rubles in raw materials, 2.5 million kilowatt-hours of electricity, and 14,000 gigacalories of heat.

Through fuller utilization of their productive and scientific-technical potential, they decided to produce above-plan output worth 2.5 million rubles, including 17,500 tons of mineral fertilizers. This will make a substantial contribution to implementation of the country's Food Program. During the pre-sowing period, the association will supply agriculture with 15,000 tons of mineral fertilizers ahead of stipulated schedule.

By improving labor organization and incentives, workers pledged to raise the proportion of personnel, involved in the brigade form, to 80 percent and to reduce work time losses by 15 percent.

They pledged to make better use of railroad rolling stock, to reduce railcar idleness by 0.1 hours under the norm, and to repair 2,500 units.

In addition to carrying out the industrial construction program, the collective pledged to put into operation 35,000 square meters of housing, a kindergarten accommodating 320 children, a school, the second phase of the recreation base, and to assimilate funds for the erection of a prophylactorium and a Pioneer camp. They pledged to expand the subsidiary farm operation and supply all the vegetables needed by the association's food services.

The association's workers pledge that they will bend every effort to complete the targets of the current five-year plan, and they appeal to collectives of enterprises in the mineral fertilizer industry to make their own labor contribution toward implementation of the decisions of the Party of Lenin, calling on them to strengthen the economic and defensive might of our homeland.

The socialist obligations were discussed and adopted at a meeting of the party-economic aktiv of the association's workers.

12255

CSO: 1841/115



# AMMONIA FACILITY ON STREAM

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Jan 84 p 1

[TASS report (Chirchik): "Builders' Success"]

[Text] A complex to produce ammonia has gone into production in the Chirchik Elektrokhimprom Association.

The builders successfully completed a very complex job. For example, the heat insulation of the giant "thermos"--the liquid ammonia storage facility. It required the erection of a 30-meter-diameter container the height of a 9-story building and the laying of a three-layer "pie" consisting of thermoblock, tar, and ruberoid, and then lowering the "thermos" into place.

The complex, with a projected capacity of 450,000 tons of ammonia per year, will produce valuable material not only for the production of fertilizers in Chirchik but also for other enterprises in the republic.

12255

CSO: 1841/115

## ADVANTAGES OF LIQUID FERTILIZER

Moscow EKONOMICHESKAYA GAZETA in Russian No 50, Dec 83 p 19

[Article by B. Leshchikov, department chief, Azot Scientific-Production Association (Nevinnomyssk): "Effective Fertilizer"]

[Text] The assortment of liquid nitrogen fertilizers in our country consists, basically, of ammonia water. Yet the cheapest form of nitrogen fertilizer is anhydrous ammonia. The prime cost per unit of nitrogen in it is lower than in any other fertilizer of this type.

But, in its ordinary form, liquid anhydrous ammonia, because of the nitrogen's volatility, has a restricted sphere of use, being applied only by surface machines and necessarily embedded in the soil. The high elasticity of the vapors from this fertilizer imposes special demands on transport conveyances, storage facilities, and application devices.

For nearly 20 years the Nevinnomyssk Chemical Combine used carbamide and ammonium nitrate floats [plavy] to produce a liquid nitrogen fertilizer provisionally called float [plav].

Float is a colorless, nonvolatile liquid. It contains 36 to 40 percent carbamide, 36 to 43 percent ammonium nitrate, and about 30 percent nitrogen. Experience has shown that it is a very stable fertilizer. No change was observed in its composition even after several years of storage. Also very valuable is the fact that float does not dry out for a long time; this provides favorable conditions for absorption by the leaves in the process of leaf feeding.

Float was used on crops in Krasnodar and Stavropol' krays, Rostov and Belgorod oblasts, the Ukraine, Karachayevo-Cherkesiya, and other zones--altogether an area of more than 600,000 hectares. A number of farms even began to request the replacement of a considerable portion of dry fertilizers with float, the liquid fertilizer. It is attractive not only because of its ease in handling but also the relatively low prime cost of production. Thus, the cost of producing 1 ton of nutrients (nitrogen) in the form of float at the Nevinnomyssk Chemical Combine is 1.4 times less than for the same quantity of nitrogen in the form of ammonium nitrate.

Conversion from dry fertilizer to float will bring considerable economic effect, estimated in hundreds of millions of rubles per year, not only in agriculture but also in industry. Today, for example, the production of granulated ammonium nitrate requires a granulating tower, the cost of which is 1-2 million rubles; the production of float does not require it. The fact that paper or polyethylene bags will also become unnecessary will save tens of millions of rubles per year. The labor of many thousands of workers will also be eliminated. It would seem that Soyuzsel'khozkhimiya ought to pay more attention to this effective fertilizer and make full use of a major reserve.

12255

CSO: 1841/115

NITROAMMOPHOS PRODUCTION STARTED AT MELEUZ CHEMICAL PLANT

Moscow SEL'SKAYA ZHIZN' in Russian 13 Nov 83 p 1

[Article: "Planned Capability Reached"]

[Text] Meleuz (Bashkir ASSR): Yesterday, a complex for production of nitroammophos was started up at the designed output rate, before the target date, at the Meleuz Chemical Plant. This was achieved during the preholiday tour of duty. At present, the enterprise is producing 125 tons of fertilizer per hour.

10,657

CSO: 1841/59

UPDATE ON PHOSPHORITE MINING IN THE ZHANATAS BASIN

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Nov 83 p 2

[Article: "Fertility Factory in Operation", TASS]

[Text] Work in the "Kok-Dzhon" mine quarries of the Karatau Order of Lenin Production Association, which mines for phosphorite ore, does not stop even at night. The workers at the youngest mine in Zhanatas Basin were the first to fulfill the 10-month program. Two and half times more ore was unloaded at processing enterprises than in the entire first year of the 11th Five-Year Plan. The mine workers have set a goal for themselves to achieve the 2 million mark in phosphorite ore recovery by the end of the year. Mineral fertilizers are helping to increase soil fertility for the people developing virgin land in Kazakhstan, Siberia, the Ural region and other parts of our country.

10,657

CSO: 1841/59



CARBAMIDE PRODUCTION STARTED UP AHEAD OF TIME IN NEVINNOMYSSK 'NITROGEN'  
ASSOCIATION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 15 Nov 83 p 2

[Article: "Capacities Ready Ahead of Time", TASS]

[Excerpt] The construction and installation workers, as well as operators of a new high-capacity complex for carbamide production have fulfilled their socialist obligations ahead of time at the "Azot" [nitrogen] Production Association in Nevinnomyssk.

On the eve of the 66th anniversary of the Great October Revolution, 2 months ahead of time, the new shop has produced the first batch of highly effective mineral fertilizer. Kolkhozes and sovkhozes will receive 10,000 tons of fertility vitamins before the end of the year.

The plasterer brigade of the Stavropol'khimstroy [Stavropol Chemical Plant Construction] Trust made a major contribution to the overall achievement of the builders of the carbamide complex.

10,657

CSO: 1841/59

PRODUCTION OF FERTILIZERS AHEAD OF SCHEDULE

Moscow SEL'SKAYA ZHIZN' in Russian 16 Dec 83 p 2

[Report from TASS, Nevinnomyssk, Stavropolskiy Kray]

[Text] A large-scale unit for fertilizer production was placed on stream ahead of schedule at Nevinnomyssk Production Association "AZOT". CPSU Central Committee heartily congratulated the construction crew on successful fulfillment of socialist pledges and bringing the unit into operation.

A meeting took place today at Association headquarters. First secretary of Stavropol Kray party committee, B. S. Murakhovskiy, delivered the CPSU Central Committee greeting text.

Participants of the meeting assured that more than 20,000 tons of granular fertilizers will be produced by the end of the year due to the pre-scheduled actuation of the unit.

12603

CSO: 1841/93

CONTEMPORARY CENTRIFUGES FOR SUGAR INDUSTRY

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 11, Nov 83  
pp 12-13

TARANETS, A. V. and KOVALEV, M. V., engineers and DZHINCHARADZE, Ye. K., candidate of technical sciences

[Abstract] The Sumi Production Association imeni M. V. Frunze is [apparently] the source of novel, highly effective centrifuges for sugar production which have been developed and are under construction. These centrifuges have a vertical rotor suspended from a beam and are capped with a driving gear. This arrangement assures excellent dynamic operational stability. Detailed technical data are presented for three different centrifuges (FPN-1251L-07, FPN-1321L-01 and FPN-1321K-01), all of which are capable of satisfying modern requirements of sugar industry. Figures 2.  
[90-7813]

UDC 666.112.5

EFFECT OF SODIUM OXIDE ON TECHNOLOGICAL AND TECHNICAL PROPERTIES OF PYROXENE PYROCERAMS

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 11, Nov 83  
(manuscript received 7 May 82) pp 2436-2439

MIN'KO, N. I., BELOUSOV, Yu. L. and ZHERNOVAYA, N. F., Belgorod Technologic  
Institute of Construction Materials imeni I. A. Grishmanov

[Abstract] The role of  $\text{Na}_2\text{O}$  in the crystallization process and its effect on the chemical resistance of iron-containing pyroxene Pyrocerams was studied by adding  $\text{Na}_2\text{O}$  to glass (percent by mass  $\text{SiO}_2$  - 58.6,  $\text{CaO}$  - 23.3,  $\text{MgO}$  - 3.3,  $\text{Al}_2\text{O}_3$  - 2.3,  $(\text{FeO}+\text{Fe}_2\text{O}_3)$  - 12.5) in amounts of 2, 4, 6, 8 percent by mass instead of equivalent quantities of  $\text{CaO}$  and melting it in an electric furnace in oxidizing and reducing media. It was found that the  $\text{Na}_2\text{O}$  level in the initial glasses with this composition should lie within limits of 3 to 6 percent in order to produce Pyrocerams with satisfactory technological and technical properties. A high level of  $\text{Na}_2\text{O}$  in the vitreous phase ( $\sim 20$  percent) reduced the chemical resistance of the Pyrocerams while a low level ( $< 3$  percent) impedes crystallization.  $\text{Na}_2\text{O}$  participates partially in construction of the crystal lattice and distributes partially in the vitreous phase during crystallization of the iron-containing pyroxene glasses. Figures 3; references 12: 9 Russian, 3 Western.  
[102-2791]

UDC 677.529:661.183

EFFECT OF  $\text{LiCl}$ ,  $\text{NaCl}$  and  $\text{KCl}$  ON ACTIVATION OF CARBON FIBERS

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 11, Nov 83  
(manuscript received 6 May 82) pp 2608-2612

MOROZOVA, A. A. and YERMOLENKO, I. N., Institute of General and Inorganic  
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[Abstract] Study of the influence of  $\text{LiCl}$ ,  $\text{NaCl}$  and  $\text{KCl}$  on the activation process and absorption properties of carbon fibers was performed with the use of carbon fibers produced by carbonization of hydrated cellulose rope fibers.

Introduction of LiCl, NaCl and KCl into the carbon fiber greatly increased the effectiveness of activation. It was found that addition of inorganic compounds, which are, simultaneously, cross-linking agents and activators and improve the properties of the carbon-fiber sorbent, can be used to intensify the process of producing fibrous carbon adsorbents with porosity regulated within wide limits. Addition of KCl produced a trend of the activation process toward development of more uniform porosity while addition of LiCl or NaCl lead to development of finer microporosity and very highly-developed mesoporosity. Figures 2; references 12 (Russian).  
[102-2791]

UDC 536.722/75:546.47'23

#### COMPARATIVE CALCULATION OF THERMODYNAMIC DATA ON ZINC SELENIDE

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 49, No 12, Dec 83  
(manuscript received 29 Mar 83) pp 1242-1244

KOBZAR'-ZLENKO, V. A. and KONOVALOV, O. M., Scientific Research Institute of Single Crystals, Kharkov

[Abstract] Differential thermal analyses were performed for the calculation of thermodynamic data for ZnSe in the temperature range 1400-2000°K. Estimations of  $H_T - H_{298}$  led to a value of 26.19 kJ/mole, and of  $S_T - S_{298}$  to a value of 14.55 J/mole·K; these values were below those previously reported (66.99 kJ/mole and 37.47 J/mole·K, respectively), but graphic comparison with the data for other compounds underscored the reliability of the present data. Equations were also derived for determining the temperature-dependence of the Gibbs potential for the formation of zinc selenide from the respective elements ( $Zn + (1/2)Se_{2r} \rightarrow ZnSe$ ). Figures 3; references 5: 2 Russian, 3 Western.  
[117-12172] r

UDC 546.49'24+546.811'24

#### PHYSICOCHEMICAL INTERACTIONS IN HgTe-SnTe SYSTEM

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 49, No 12, Dec 83  
(manuscript received 28 Apr 83) pp 1247-1250

VENGEL', P. F., TOMASHIK, V. N. and MIZETSKAYA, I. B., Institute of Semiconductors, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] A phase diagram was constructed for the HgTe-SnTe system based on physicochemical analysis (differential thermal analysis, x-ray analysis, microstructure evaluation, hardness measurements). The results revealed that

the diagram represented a eutectic system with limited mutual solubility of the components in the solid phase. The eutectic system contained 45 mole% SnTe and crystallized at  $584 \pm 3^\circ\text{C}$ ; the solubility of SnTe in HgTe at the eutectic temperature did not exceed 1 mole%, while the solubility of HgTe in SnTe was on the order of  $7 \pm 1$  mole%. Thermodynamic data for the HgTe-SnTe system along the liquidus plot are presented in a tabular form. Figures 2; references 3 (Russian).  
[117-12172]

UDC 541.135.52+541.138.2:546.621

#### ANODE SOLUBILITY OF ALUMINUM IN ALCOHOL SOLUTIONS OF LiCl

Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL in Russian Vol 49, No 11, Nov 83  
(manuscript received 20 Sep 82) pp 1181-1186

KOZIN, L. F. and NAGIBIN, S. N., Institute of General and Inorganic Chemistry, UkSSR Academy of Sciences, Kiev

[Abstract] No single opinion was found in the literature to explain the mechanism of ionization of aluminum. To study the mechanism of ionization of aluminum, analysis was made of the anode solubility of aluminum in alcoholic LiCl solutions containing HCl by the method of rotating disc electrode with a ring (VDEK). In this system the Al ions of intermediate valence were more stable than in aqueous solutions. The oxidation current of  $\text{Al}^+$  was registered on the ring electrode; the yield of these monovalent ions dropped with increased water content in the alcohol. It was concluded that the formation of trivalent aluminum ions during its anode solution occurs by two parallel routes: disproportionation reaction of  $\text{Al}^+$  ions and chemical reaction with hydrogen ions from acid or water. In ethanol, the disproportionation reaction constant was 3.2 times greater than the constant of  $\text{Al}^+$  reaction with acid. Figures 3; references 19: 11 Russian (1 by Western author), 8 Western.  
[79-7813]



UDC 546.791:542.61:541.49

LIGAND EXCHANGE PROCESSES IN URANYL COMPLEXES WITH TERTIARY ARSINE OXIDES  
IN AQUEOUS SOLUTIONS

Leningrad RADIOKHIMIYA in Russian Vol 25, No 5, Sep-Oct 83  
(manuscript received 6 Aug 82) pp 628-631

YAKSHIN, V. V., LYUBOSVETOVA, N. A., KHOKHLOVA, N. L., KAZAKOV, V. P. and  
AFONICHEV, D. D.

[Abstract] Behavior of  $R_3AsO$  type compounds in deactivation of uranyl fluorescence was studied in an attempt to obtain kinetic characteristics of the complex formation process of  $U_2^{2+}$  with  $R_3AsO$ . An important role in these deactivation processes was played by the spacial structures of substituents at the As Atom: chain length increase from  $R = CH_3$  to  $R = C_5H_{11}$  and introduction of phenyl radical intensified deactivation processes and increased  $K_{quench}$  by two orders of magnitude. Branching of the R radical appeared to lower the  $K_{quench}$  values. Increase of the basic strength in the series  $(CH_3)_3AsO-$   $(C_2H_5)_3AsO-(C_4H_9)_3AsO-(C_6H_5)_3AsO-(C_6H_5CH_2)_3AsO$  is also accompanied with increased  $K_{quench}$  values. It was shown that ligand exchange constants in  $UO_2^{2+}$  complexes with  $R_3AsO$  are functions of spacial and electronic structures of ligands and are described by linear equations based on reaction constants  $\sigma^*$  and  $\sigma^{\phi}$ . Figures 2; references 9: 8 Russian, 1 Western.  
[78-7813]

ANALYSIS OF CYANAMIDE AND CYANAMIDE- $d_2$  VIBRATION SPECTRA BY CNDO/2 GRADIENT METHOD

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA in Russian No 6, Nov-Dec 83  
(manuscript received 8 Jun 83) pp 536-541

KHAYKIN, L. S., MOCHALOV, V. I., GRIKINA, O. Ye. and PENTIN, Yu. A.,  
Chair of Physical Chemistry

[Abstract] Polyempirical calculations were conducted on the field of force of cyanamide and cyanamide- $d_2$  by the Pulay method relying on CNDO/2 approximation. The corrected fields of force showed good agreement with data in the literature on the IR spectra of cyanamide and cyanamide- $d_2$  in Ar matrix, with deviations from experimental data not exceeding  $30\text{ cm}^{-1}$ . The calculations resulted in the reassignment of a number of bands below the  $500\text{ cm}^{-1}$  frequency and in further definition of the frequencies of a number of fundamental vibrations of low intensity for the cyanamide- $d_2$  sample. References 15 (Western)  
[114-12172]

UDC 542.943.5

OZONE REACTION WITH TRIBUTYLPHOSPHATE

Leningrad RADIOKHIMIYA in Russian Vol 25, No 5, Sep-Oct 83  
(manuscript received 13 May 82) pp 621-625

VYATKIN, V. Ye., GUREVICH, D. M., DAVYDOV, Yu. P. and SHCHERBAKOVA, L. L.

[Abstract] Tributylphosphate (TBP) is practically the only extracting agent used for isolation and purification of valuable radionuclides used or formed in nuclear fuel cycle. Study of the reactions of TBP with ozone, with the TLC method showed that the principal products were dibutyl-, monobutyl-, and orthophosphoric acids. The reaction rate of TBP with ozone determined in  $\text{CCl}_4$  solution did not depend on the surface of phase separation. Analysis of NMR spectra in the 5-7 MD range showed that double bond fragments existed only as intermediate products breaking down during prolonged ozonization. The reaction of TBP with ozone is rather slow. Analysis of kinetic constants showed that the reaction is rather complex: ozone reacts with TBP and at the same time with all byproducts: dibutyl- and monobutylphosphonic acid as well as with splitting butyl groups. This process may be stopped after breakdown of TBP only or after all organophosphoric compounds become converted to phosphoric acid and its salts. Figures 3; references 6 (Russian).  
[78-7813]

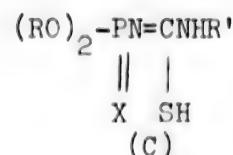
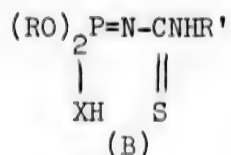
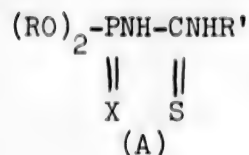
UDC 547.26'118

STUDY OF PHOSPHORYLATED THIOUREA STRUCTURES BY IR SPECTROSCOPY

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 12, Dec 83  
(manuscript received 24 Dec 82) pp 2659-2665

ISLAMOV, R. G., ZIMIN, M. G., KAMALOV, R. M., POMINOV, I. S. and PUDOVNIK, A.N.,  
Kazan State University imeni V. I. Ul'yanov-Lenin

[Abstract] Relationship between the structure of N-alkyl and N-aryl substituted N'-dialkyl(thio)phosphorylthioureas and their tautomers was studied by IR spectroscopy. These compounds exist in three principal tautomeric forms:



It was shown that, in a condensed phase, thiourea exists in form (A), which was also the only form found in polar and non-polar media. In concentrated solutions these compounds were found to be associated through intramolecular hydrogen bonds formed between PNH, C=S and P=S groups. With acetonitrile, these thioureas form a heteroassociated product with a 1:2 composition in which both NH groups participate. In the heteroassociates which include P=O group, intramolecular H bond is retained; this heteroassociated product forms through the H atom from the PNH fragment. Figures 2; references 11: 9 Russian, 2 Polish. [129-7813]

UDC 547.26.118

# DIKETENE IN ORGANOPHOSPHORIC SYNTHESIS, PART 3: REACTION WITH SILYL PHOSPHITES AND DIALKYLPHOSPHITES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 12, Dec 83  
(manuscript received 7 Jul 82) pp 2665-2669

PUDOVIK, A. N., SOBANOV, A. A., BAKHTIYAROVA, I. V. and ZIMIN, M. G.,  
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[Abstract] Room temperature reactions of diketene with trimethylsilyldialkylphosphites occurred without catalysts or solvents with opening of the ring and after chromatographic purification led to the formation of 1-trimethylsilyloxy-1,1-bis(dialkylphosphonyl)butan-3-one. A possible reaction mechanism is discussed for this conversion. In the reaction of diketene with dimethyl-, diethyl- and dibutylphosphites catalysts were required; in presence of trifluoroboron ether, sulfuric acid or p-toluenesulfonic acid the reaction products were dialkylesters of acetoacetic acid. References 9: 8 Russian (1 by Western author), 1 Western. [129-7813]

## REACTION OF DIPHENYLPHOSPHITE WITH TETRAPHENYL AND 2,5-BIS(METHOXYCARBONYL)-3,4-DIPHENYLCYCLOPENTADIENONES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 12, Dec 83  
(manuscript received 7 Jan 83) pp 2669-2675

ARBUZOV, B. A., FUZHENKOVA, A. V. and GALYAUTDINOV, N. I., Scientific Research Institute imeni A. M. Butlerov, Kazan State University imeni V. I. Ul'yanov-Lenin

[Abstract] Reaction of tetracyclone with diphenylphosphite was studied, showing that the latter behaved analogously to dimethylphosphite, the only difference being in the stereochemistry of the products. In absence of catalysts, above reaction yielded diphenyl(4-oxo-1,2,3,5-tetraphenyl-2-cyclopenten-1-yl)phosphonate and diphenyl(5-oxo-1,2,3,4-tetraphenyl-2-cyclopenten-1-yl)phosphonate. In presence of triethylamine, the reaction is slower, requiring boiling benzene as a reaction medium to yield diphenyl-(2,3,4,5-tetraphenyl-1,4-cyclopentadien-1-yl)-phosphate. In contrast to dimethylphosphite, the reaction of diphenylphosphite with 2,5-bis(methoxycarbonyl)-3,4-diphenylcyclopentadienone gives dimethyl(1-diphenoxyphosphinoyl-2,3-diphenyl-5-oxo-2-cyclopenten-1,4-ylene)dicarboxylate and in presence of diethyl or triethylamine as catalysts, it yields corresponding ammonium salts of its enol form. References 9: 7 Russian, 2 Western.

[129-7813]

## REACTIONS OF 1,5-DIKETONES, PART 43: PHOSPHONYLATION OF 2-METHYLENE-1,5-DIKETONES WITH DIALKYLPHOSPHITES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 12, Dec 83  
(manuscript received 1 Feb 83) pp 2675-2680

VYSOTSKIY, V. I., PRIKHOD'KO, Yu. V., PAVEL', G. V. and TILICHENKO, M. N., Far East State University, Vladivostok

[Abstract] In continuation of their studies of the synthesis of organophosphorus compounds based on 2-methylene-1,5-diketones, the authors extended this reaction to dialkylphosphites; in presence of sodium methoxide, esters of phosphonic acids of the hydroxydihydropyran series were obtained. This reaction could be accompanied by further cyclization leading to substituted 2,3-dihydro-4H-pyran-5-yl-methylphosphonates or 2-hydroxy-2,3-dihydro-4H-pyran-5-yl-methylphosphonates. In solutions, the latter are capable of opening the ring to form 1,5-diketones containing a phosphonate group in the molecule. References 4: 3 Russian, 1 Western.

[129-7813]

## DIALKYLTRIFLUOROMETHYLPHOSPHONATES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 12, Dec 83  
(manuscript received 3 Mar 83) pp 2681-2684

MASLENNIKOV, I. G., LAVRENT'YEV, A. N., LYUBIMOVA, M. V., SHVEDOVA, Yu. I.  
and LEBEDEV, V. B., Leningrad Technologic Institute imeni Lensovet

[Abstract] Nonsymmetric esters of trifluoromethylphosphonic acid were synthesized from trifluoromethylphosphonites. Starting from trifluoromethyl-dichlorothiophosphonate, O,(*i*)-diethyltrifluoromethylthiophosphonate was obtained, b.p. 59-61°C/15 mm Hg. Comparison of chemical shifts of phosphorus nuclei in CH<sub>3</sub>- and CF<sub>3</sub>- phosphonates showed a shift in phosphorus nuclei resonance by 32-36 m.d. towards the stronger field. This observation could be used for identification of new trifluoromethylphosphonates. References 11: 4 Russian (1 by Western authors), 7 Western.  
[129-7813]



## PESTICIDES

### PROBLEMS IN KHIPROM ASSOCIATION IN UFA

Moscow SOVETSKAYA ROSSIYA in Russian 14 Dec 83 p 3

[Article by B. Odintsov, chief of sector RSFSR KNK [People's Control Committee]

[Text] "They fine us, we fine others..." In the "Khiprom" production association in Ufa this game is willingly commented as: "But even here the balance is to our advantage; for we get in fines almost a million rubles more than we pay".

Nevertheless, this consolation is quite weak, it just says that things are even more in disorder among users. In addition, farm workers get neither herbicides nor a larger crop from the fines received from "Selkhozkhimiya" for not returning packaging materials.

But it is precisely herbicides, the other way of chemical protection of plants, that is indispensable to the country. The herbicides reduce time-consuming manual agricultural work, affect beneficially the soil by increasing its output. It is hardly worth reminding here that chemical agents are as scarce as before and that this shortcoming should be overcome swiftly and effectively. In addition, this should be done under minimal consumption of imported raw materials, careful handling of energy, fuel and all other resources utilized in a technological cycle.

Now, how does the "Khiprom" guide itself along these obvious requirements? Just recently, the People's Control Committee of the RSFSR analyzed the situation in the association in Ufa and noted very serious blemishes in its work. The committee criticized disruption of orders from rural workers and irresponsible management of resources.

The head of the "Khiprom", A. I. Seleznev insisted, as expected, that on the whole, they do fulfill the plan with respect to both profit and realization. But this is the old, all-to-well-known story all over again! Everyone is fully responsible for the production deficiency in products list and assortment. And hardly anything else can, for example, substitute 1500 tons of herbicides that "Selkhozkhimiya" awaited in vain since last year from people in UFA. Other users are also in a continuous unsatisfied supply line. They do not get appropriate amounts of caustic soda and chlorosulfonic acid. By the way, the sum of such liabilities (regarding the assortment) this year has already reached 2.5 million rubles.

On occasion, chemists explain the disruption of planned quotas as due to shortages of raw material. But in Ufa, raw materials are in surplus of 7.7 million rubles, considerably higher than the established allowance. However, in what a barbarous way this raw material and other resources are being handled there in Ufa. Especially "out of luck" are hydrochloric and spent sulfuric acids. Actually, they should have become commodity production long ago; nevertheless, in the meantime, they are being dumped into... sewage. At the same time, of course, some means of fighting pipe corrosion are applied. Acids are neutralized. It is being done, however, not with application of cheap lime but by use of caustic soda instead.

The most frightening is the fact that the losses are treated in "Khimprom" as compelled expenditures. "Big deal - dumped into sewage ten tons of caustic..." But the fact that, because of undershipment of this material, some chemical-fiber plants are partially idle does not seriously upset anybody. There is nobody in the "Khimprom" who bears even the slightest responsibility for that.

This attitude is the same toward finished products as well. A great deal of chemical agents and raw material are stored out in the open; not everything is covered even with just canvas. Should rain, snowfall occur--no one would get disturbed either. A user will endure everything, anyway. So he must endure scrap, several tons of miscount and/or transportation losses due to poor tightness of packing.

It is possible and necessary to calculate the total of such losses and non-productive expenses. Last year it cost "Khimprom" 1.6 million rubles, and they had just approached this "boundary" after 3 past quarters of this year.

The legitimate question now is: Just what, specifically, the people and the head of the association, personally, are doing in the light of requirements of November 1982 and June 1983 Plenums of our party?

Earlier, people from "Khimprom" joined the All-Union public care program for saving raw materials, fuels and energy resources. In Ufa they even have pledged to incorporate "three measures with a relative effect of 21 thousand rubles". Now compare that sum with a general consumption of raw materials and resources equal to 100 million rubles. There is no need to remind anybody that "Khimprom" completed the care program with a negative deficit. But how brilliantly thrift, albeit on paper, appeared to the association in the eyes of superiors. Over there too, nobody inspected in depth the state of affairs or checked many inflated numbers. Simply, the note from "Khimprom" was approved and directed to further channels. And, as a result of the care program, the association in Ufa was awarded in 1982 an economy diploma of VTsSPC [All-Union Central Council of Trade Unions], TsK VLKSM [Central Committee of the All-Union Leninist Young Communist League] and USSR Gossnab. Alas, even this diploma, regarded as a small credit, did not direct the people in Ufa toward real economy. Results of last inspection show that as far as the economy goes, things got worse in Ufa. Naturally, RSFSR KNK could not address, specifically, the actual offenders. In particular, the committee has given a stern reprimand to the head of "Khimprom" A. I. Seleznev. In addition, "the advocate of setting fines and paying fines" will have to compensate for the losses imposed on the country but this time out of his own personal savings.

The most important thing now is to draw objective conclusions out of the KNK resolution. There are many difficulties in the "Khimprom" but almost all of them are of a subjective type. So, for instance, it would be sinful for the enterprise to complain about imported raw material supplies or purchasing a costly equipment from abroad. Also, the collective of workers in Ufa happens to be quite large and tuned-up. So, the production should be skillfully organized and all the services should be set up for economy and savings. It is our hope that the shortcomings revealed through the inspection will be soon eliminated. All the more so since we were officially assured on this point by the directors of the All-Union Association "Soyuzkhimzashchita". Let their words not be at odds with deeds. The role of chemistry in the food program is one of the leading roles.

12603

CSO: 1841/93

PETROLEUM PROCESSING TECHNOLOGY

NEW METHANOL PLANT TO BE PUT IN OPERATION

Moscow EKONOMICHESKAYA GAZETA in Russian No 43, Oct 83 p 16

[Article: "Before the Main Start-Up"]

[Text] After a trial run, installation work is being finalized at the methanol plant. It is essentially completed in the synthesis, distillation and compression zones. Burnishing of auxiliary boiler and pumps in the demineralization zone is almost finished. As noted at the daily briefings, the installation workers of the "Prommekhanomontazh" [industrial mechanical or machine installation] Trust (section chief, V. Kolmikov) are working particularly well.

Warrantee tests of the methanol installation are imminent. When it starts to operate at the planned capacity this installation, which is the largest in the world, will produce 750,000 tons of methanol per year.

10,657

CSO: 1841/59

POLYMERS AND STEAM USED TO RECOVER PETROLEUM ON BUZACHI PENINSULA

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Nov 83 p 1

[Article by G. Groyser (TASS correspondent), Shevchenko: "Increased Yield From Strata"]

[Text] The miners on Buzachi Peninsula are performing well the task of expeditious development of the petroleum resources of Western Kazakhstan. Yesterday, they recovered the 10 millionth ton of raw material, ahead of the target date, from the start of work at this mine. Extensive introduction of progressive methods for increasing stratum yield is to be credited for this achievement.

The first brown derricks appeared in the sand and salt marshes of Buzachi only 4 years ago. To recover petroleum there, the workers had to forego the traditional pumping of water to maintain pressure in the underground layers: the water could not "propel" the viscous petroleum in the wells. At the suggestion of scientists, a polymer was used here. This increased drastically the productivity of the mine. The miners also use thermal methods. High-power generators pump steam at hundreds of degrees temperature into the mines, which softens the tarry petroleum.

10,657  
CSO: 1841/59

## IMPROVEMENTS IN OIL REFINING PLANNED

Moscow EKONOMICHESKAYA GAZETA in Russian No 48, Nov 83 p 2

[Unattributed review: "Intensified Petroleum Refining"]

[Text] The Soviet Union ranks first in the world in oil production. In 1982, some 613 million tons of this valuable hydrocarbon raw material were produced, including gas condensate.

At a meeting of the CPSU Central Committee Politburo, which examined matters involving stepped-up efforts to make economical and rational use of oil products, it was emphasized that petroleum occupies a special place among material resources. Oil recovery is carried on in increasingly remote regions and is becoming increasingly costly with each passing year. Attention was focused on the necessity of unconditional fulfillment of plans for the development and practical adoption of effective fuel-saving equipment and technology, improving the system of setting norms and keeping track of the consumption of fuels and lubricants.

"...Enhance the effectiveness of petroleum utilization, ensure further intensification of refining and reduce oil and petroleum product losses"-- this was the task set forth at the 26th Party Congress. In accomplishing it a key role is to be played by the scientific-technical programs "Develop and Adopt Technological Processes and Integrated Automated Installations To Ensure An Increase in the Intensity of Oil Refining to Seventy Percent" and "Develop and Introduce the Production of High-Quality Mineral and Synthetic Commercial Oils, Plastic Lubricants, and Cooling Lubricants."

### With Maximum Effect

During the 11th Five-Year Plan, construction is under way on combined facilities for hydrofining and catalytic cracking of vacuum distillates and, also, combination systems which additionally incorporate a head process of vacuum distillation of fuel oil and viscosity breaking (light thermal cracking) of tars. Slow-coking and hydrocracking units are also being built.

Several systems of this type will go into operation in the near future in a number of petroleum refineries. Moreover, each new unit in turn will incorporate improvements as they become ready. For example, in a unit for the Moscow



Petroleum Refinery, use has been made of elements of a recovery component to intensify coke roasting and reduce the temperature of gases fed into the cyclone dust-collector system. In subsequent units plans call for using a new type of regenerator to burn all the carbon monoxide within the apparatus, thus making it unnecessary to install a bulky external recovery boiler.

Catalytic cracking units serve as the main component in existing combination systems for more intense fuel-oil processing as well as more complex ones to be built. In such complexes, thanks to catalytic cracking and viscosity breaking, it is possible to increase the output of light [svetlyye] petroleum products from West Siberian crudes up to 70 percent. This is 1.4 times greater than with the use of light petroleum fractions alone.

The principle of combining high-tonnage and energy-intensive oil-refining processes makes it possible to improve the use of heat and to eliminate operations involved in cooling, pumping, and storing intermediate products. Compared to the ordinary array of separate installations turning out the same product, the buildup area, for example, is reduced by a factor of 4.5, capital investments are reduced by 1.6 times, operating costs (excluding the cost of the oil) are reduced by half. Labor productivity is doubled.

Eventually the necessity will arise for intense catalytic and thermocatalytic refining of tars from sulfur-bearing crudes in order to additionally boost the production of petroleum-base motor fuels, reduce the sulfur content in boiler fuels, and produce low-sulfur and low-ash coke and raw sulfur. The resolution of these tasks is complicated by the unfavorable composition of sulfur-bearing tars--the presence of asphalt-resin substances and metals which have a harmful effect on the catalysts.

Present foreign and Soviet processes of intense refining of sulfur-bearing tars are characterized by a number of difficulties and shortcomings. Direct hydrodesulfurization requires high pressures (up to 150 atmospheres) and higher catalyst consumption. Preliminary refinement of tars with a light solvent (deasphaltization, demetallization) requires large amounts of heat. Coking and thermal-contact cracking of sulfur-bearing tars result in large outputs of sulfurous coke and gas and shorten the useful life of oil [zhirnyye] products. Serious difficulties arise in the catalytic refining (hydrofining) of the resulting secondary distillates.

Soviet scientists and engineers will have to find a rational technique for intense refining of sulfur-bearing tars. This will require additional scientific-research and experimental-design work to determine the basic technological processes, and, also, the development of new equipment for apparatus design.

The inclusion of these processes in the layout of oil refineries will make it possible to obtain from tar an additional 17.6 percent motor fuel and 31 percent vacuum gas-oil, which serves as raw material for catalytic cracking and hydrocracking.

## Standardized Assortment

In accordance with the targets of the scientific-technical program in the 11th Five-Year Plan, efforts are being made to improve the structure of production of lubricants. Special attention is focused on matters of standardizing and optimizing the assortment of lubricants, creating a long-range standardized assortment, and utilizing regenerated oils.

### Increase in Volumes of Oil Refining (1975 = 100%)

1975	100
1980	120
1983	125

Series production of winter oils for heavy-duty tractor diesels and large-load truck diesels will begin in 1985. The work is proceeding successfully.

In 1984 it will be necessary to start up industrial production and in 1985 to organize series production of high-quality motor oil for diesel locomotives to be operated in the North. An experimental batch was delivered on time to the Kolomna Diesel Locomotive Construction Plant for tests. But stand tests have not yet been started, even though their completion timetable elapsed in the third quarter of 1983. The client and consumer of the new oil--the Ministry of Heavy and Transport Machine-Building, under whose authority the Kolomna Diesel Locomotive Building Plant is, must take measures to make up for lost time. Especially since, according to calculations of the Ministry of Railways Central Scientific Research Institute, the use of the oil in diesel locomotives for the Baykal-Amur Mainline will yield an economic effect totaling more than 900,000 rubles.

Of special importance in reducing the consumption of motor oil is the necessity of improving the fractional makeup of the base substances. One section in the program calls for the industrial assimilation of a technological process of fuel oil distillation to yield narrow oil fractions. The unit is to go into operation in 1985. The USSR Ministry of Petroleum Refining and Petrochemical Industry ought to focus attention on the construction timetable of the oil unit.

The VNIIPKneftekhim Institute, in collaboration with organizations and enterprises of the USSR Academy of Sciences, the Ministry of Automotive Industry, the Ministry of Tractor and Agricultural Machine Building, and the USSR State Committee for Supply of Production Equipment for Agriculture, is carrying out important tasks in the development of plastic lubricants for machines and equipment. Full outfitting of an industrial facility to produce a standard railroad lubricant at the Berdyansk Experimental Petroleum and Oil Plant was completed in 1983. The first industrial batch will be produced there in 1984, and series production will begin in 1985.

A facility to produce general-purpose lithium lubricants by the continuous method went into operation in Berdyansk last year. Compared to present technological layouts, this one serves to reduce the metal consumption of the main

equipment by 5 to 6 times, energy costs by 3 to 2.5 times, and capital investment by 25 to 30 percent. The prime cost of the product is reduced by 7 to 8 percent, and the quality of the lubricant is guaranteed. The economic effect from putting one such facility into operation exceeds 700,000 rubles per year.

#### Speeds Will Increase

The VNIIPKneftekhim Institute is also the head organization for coolants and lubricants and technological lubricants for various processes of cold metalworking (cutting and pressure). A complex of scientific-research work has been carried out to study the effect of various components and lubricant-coolant liquids and technological lubricants on processes of contact interaction in metalworking. Recommendations that have been issued will make it possible to predict the composition of new lubricant-coolant liquids and technological lubricants and their selection. Organizations of the Ministry of Automotive Industry and the USSR State Committee for Supply of Petroleum Products are jointly dealing with problems of utilizing spent motor and industrial oils as the basis for the production of lubricant-coolant liquids and technological lubricants.

Also being planned is the industrial introduction of new all-purpose and multipurpose oil-based lubricant-coolant liquids permitting high-speed cutting modes. Nearing completion in 1983 is determination of the base assortment of lubricant-coolant liquids for the whole national economy and a standardized assortment for particular sectors of industry.

Rational use of lubricant-coolant liquids constitutes an important reserve for boosting labor productivity in metalworking. Without effective lubricant-coolant liquids it is impossible to ensure normal operation and high durability of the cutting instrument, to realize in full measure the capabilities of today's metalworking equipment, or to produce high-quality machined surfaces.

The new lubricant-coolant liquids increase the durability of the cutting instrument by 1.2 to 2 times, raise the productivity of metalworking by 15 to 20 percent, and enhance the sanitation and hygienic conditions of the work. Unfortunately, the metalworking sectors have not been adequately supplied with these types of liquids. Responsibility for this goes to the USSR Ministry of Petroleum Refining and Petrochemical industry. Effective lubricant-coolant liquids that have been put into production are not being produced in adequate quantities, and new developments are slow to go into series production.

The key element in the development and adoption of industrial production of new lubricant-coolant liquids and technological lubricants for heat processing of metals under pressure is the Ministry of Chemical Industry. In accordance with the program, the ingredients have been worked out for new lubricant-coolant liquids and technological lubricants for hot stamping of steels and alloys, and the theoretical bases of the synthesis of new materials have been mapped. In terms of their basic parameters, the resultant Soviet lubricant-coolant liquids and technological lubricants are not inferior to similar imported items, and they are superior in many respects. The use of the new lubricant-coolant liquids for the manufacture of KamAZ vehicles alone has yielded an economic effect of 300,000 rubles.

Work is under way in 1983 to introduce, on an experimental basis, a low-operation and low-waste process for the production of high-alkali sulfonate additives. Carrying out a technological process using the new material will considerably increase the quality of the additive, its purity, and dispersive properties. In terms of quality, the product is on par with the best samples in the world. In 1984 plans call for starting the experimental production of multifunction additives for motor oils for heavy-duty diesels. The production of neutral sulfonate additives will begin.

A number of problems included in the programs are being dealt with on the basis of bilateral and multilateral collaboration with the CEMA-member countries, including scientific-technical problem coordination centers created for these purposes. Implementation of joint efforts throughout the whole chain "science-technology-production-marketing" is the responsibility of the international economic partnership internefteprodukt.

The resolution of concrete tasks and the entire complex of projects set forth in the programs on oil refining will make it possible to provide the national economy with high-quality fuels and lubricants with considerable energy resource savings.

12255

CSO: 1841/115

## SHORTCOMINGS IN NIZHNEVARTOVSK PETROLEUM MINING WORK

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Nov 83 p 1

[Article by L. Kozodoy, petroleum and gas miner of the Megion Petroleum and Gas Mining Administration of the Nizhnevartovsk Petroleum and Gas Mining Association and member of the Khanty-Mansiyskiy Okrug CPSU Committee, Nizhnevartovsk: "The Gushers Have Quieted Down. Who Keeps Promises and How"]

[Text] Since October of this year, the miners of Tyumen have been furnishing the nation with a million tons of fuel daily. Worldwide petroleum mining practice had not heard of such a rate.

Against the background of this achievement, the following fact appears strange: since the start of this year, Glavtyumenneftegaz [Main Administration of the Petroleum and Gas Industry in Tyumen Oblast] has failed to deliver almost 2 million tons of fuel. The bulk of this debt is referable to our Nizhnevartovskneftegaz [Nizhnevartovsk Petroleum and Gas Mining] Association.

For several years, the Samotlor mine has been operating at the planned capacity. There is a ponderable amount of added fuel now coming from new "cupboards" in the north, although they are not as famous as Samotlor, and they are quite promising. However, more than 16% of our wells are not productive for different reasons, which we shall discuss below. As a result, the extra tons of fuel recovered in Nefteyugansk and Surgut are used to cover the debt of the Nizhnevartovsk miners. It is sad and difficult to realize that we are, so to speak, being subsidized by our comrades in the socialist competition.

Yet it is only recently that the drill operators made a sizable contribution to petroleum mining, handing over to the mine operators mainly oil gushers. But, already at the start of the 11th Five-Year Plan, only 30% of the fuel was recovered from the new wells in Nizhnevartovsk by the gusher method and 70% by the mechanized method. This year, mechanized mining will exceed mining by the gusher method by almost 7 times. This means that the fate of much of the petroleum of Tyumen is presently in the hands of the mine operators. What is preventing us from working better?

We shall start with the sorest factor, delivery of workers to the work place. Is it right to send brigades to different wells, sometimes tens of kilometers



apart from one another, on the same bus? This means that travel time, which would have covered a considerable distance even to one destination, is 2-3 hours longer. And recently, four brigades of the underground well repair shop of the Nizhnevartovskneft' Administration spent almost their entire work shift waiting for the bus and had to return to their homes, since no transportation was ever found for them. And this happens here, in Nizhnevartovsk, where thousands of trucks and buses pound the pavement from morning to night!

Well, let us assume that the transportation service worked properly. It is rare, anyhow, for our shifts to begin on time, most often because of interrupted power supply. According to the incomplete data of the deputy chief power engineer of the association, A. Vereshchagin, the power was turned off almost 1000 times at the mines over a period of 9 months this year. Three emergency situations per day!

At the present time, there is probably no task that is more important than engineering support of petroleum workers. In Nizhnevartovsk, it is appreciably behind the level to which it has already advanced in Nefteyugansk and Surgut. Here is an example. We have the largest central base for industrial supply of oil mining equipment, which is the foundation for accident-free operation of the mechanized resources of the oil wells. Nevertheless, the oil miners of Nefteyugansk were able to extend the well operating periods to 400 days between servicing of electrical loading equipment. For us, such periods constitute only 268 days.

The miners of Nefteyugansk, who have taken over all of the best from the oil workers of Tatar ASSR and Bashkir ASSR, have established technological groups as part of the personnel of underground repair shops and they are adopting a progressive unregulated system of paying wages. In our mines, little attention is still being given to the well operating and repair services.

Whose labor is furnished the least with equipment? Ours, i.e., that of the operating staff. Who experiences the greatest need for housing, nurseries and other social, cultural and domestic amenities? Again, the answer is the operating staff. And our wages are much lower than, let us say, the drill operators. Hence the personnel turnover. This year, for example, about 300 operators for underground well repair work were hired in our association, while more than 200 went away.

The related ministries that provide the necessary materials and equipment to the Tyumen miners do not display a proper degree of responsibility for our needs. The department of reliability, which was specially established to check the quality of incoming equipment, does not have time to prepare the paperwork concerning the numerous "bugs" and sometimes outright flaws in equipment delivered by enterprises under the Ministry of Chemical Plant Machinery. There are particularly many claims against the Baku Machine Building Plant imeni Lieutenant Shmidt and the "Borets" [Fighter] Association in Moscow. For example, we start up a new compressor and it malfunctions right away. We find that ... some of the molding sand was left in it after casting the casing. Another piece of equipment cannot be operated because a piece of wire was "left" in the airtight refrigeration chamber when it was being assembled, and it caused a short circuit.



There is yet another situation that is most familiar to the mine workers: A compound with industrial salt, which is needed for repair work, has arrived at the railroad station. It has to be packaged in jute sacks, and it is more convenient to unload the cars that way. However, the potassium plant in Novo-Solikamsk and the Bassol' [basin salt] base in Akhtubinsk, in Astrakhan Oblast, load their product in bulk.

The brigades resort to all sorts of tricks to remove the frozen mounds, which are as hard as granite, from the railroad cars. Neither crow bars nor even picks can pry them loose. Local rationalizers have built a special platform and installed a drill on it. But there were more problems! The car falls apart from the strong vibration, while the snow-white monolith is totally unaffected. Just estimate our losses knowing that thousands of various types of repairs on oil wells are made annually at the mines in Tyumen, and about 16 tons of industrial salt are needed for each of them.

We are glad for the achievements of our rivals in the competition, the workers in Nefteyugansk, who recovered 646,500 tons of fuel in excess of the plan over a 10-month period this year. And, of course, we are acutely aware of our shortcomings. We think that it is high time to finally bring order to the oil wells of Nizhnevartovsk and for a change in attitude toward the groups of operators, upon which the fate of major petroleum in our country depends primarily at the present time.

10,657  
CSO: 1841/59

### THIRD SECTION OF TOMSK PETROCHEMICAL PLANT NEAR COMPLETION

Moscow EKONOMICHESKAYA GAZETA in Russian No 43, Oct 83 p 16

[Article: "Start-Up Is Not Far Off"]

[Text] The Khimstroy [chemical plant construction] Administration is working full swing on erection of the third section of the Tomsk Petrochemical Plant, for production of formalin and carbamide resins. The plan is to start its operation in the fourth quarter of next year. But there are fears that the installation and start-up and adjustment workers will have virtually no time left for their work; again, the suppliers are letting them down. The "Krasnyy kotel'shchik" [Red Boilermaker] Plant in Taganrog and "Energomash" [Power Engineering] Plant in Saratov have already missed the target dates for delivery of filters, separators, mixers and condenser coolants. The builders of the petrochemical giant in Tomsk remind the worker groups at the machine plants in Armavir and Chernovtsy, Petroleum Machinery Plant in Bugulma, chemical machine plants in Kemerovo, Staraya Russa and Poltava that the delivery dates for equipment will lapse in the fourth quarter of this year.

10,657

CSO: 1841/59

UDC 541.127:(547.213+547.313)

EFFECT OF ADDITIONS OF PROPYLENE AND ISOBUTYLENE ON PROPANE CRACKING

Ivanovo IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: KHIMIYA I KHIMICHESKAYA  
TEKHOLOGIYA in Russian Vol 26, No 11, Nov 83 (manuscript received 11 Mar 82)  
pp 1302-1305

KARNAUKHOVA, L. I., STEPUKHOVICH, A. D. (deceased) and DUDINA, N. Yu.,  
Chair of Chemical Physics, Saratov State University imeni N. G. Chernyshevskiy

[Abstract] The goal of this study was to verify additive effect of individual or simultaneous addition of two olefines (propylene and isobutylene) during propane cracking and, furthermore, to explore possible transition from retarding to accelerating effect of the catalyst, as observed in case of n-hexane. It was shown that at 540-560°C, addition of 3% of isobutylene had a stronger effect on retarding the reaction than did addition of 3% of propylene; simultaneous addition of both retardants had an intermediate effect, indicating that reactions retarding propane cracking occurred independently of each other. At 600°C a transition was observed from retarding to accelerating effect upon addition of above olefines; the strongest effect was observed with propylene, a weaker one with isobutylene and the weakest one--with simultaneous addition of both reagents. Figures 3; references 7: 6 Russian, 1 Western.  
[105-7813]

UDC 622.276.6

FLUE GAS METHOD FOR EXTRACTING PETROLEUM APPLIED TO KYURSANG OIL FIELD  
CONDITIONS

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 83 pp 9-11

AGA-ZADE, E. G., ALIYEV, M. E., BOGOPOL'SKIY, A. O., ISMAYLOV, L. A. and  
KADYROVA, E. I., Azerbaijan Scientific Research and Design Institute for  
Petroleum

[Abstract] The Kyursang, Karabagla and Kyurodag oil fields all have low stratal permeability and high stratal fluid pressures that limit the effectiveness of water as an extracting agent. The present study reports on use of flue gases and other gases for extraction at the Kyursang oil field, with a model

containing quartz sand of 0.3 porosity, permeability of  $2 \cdot 10^{-13} \text{ m}^2$  and initial water saturation of 15% and petroleum saturation of 80-85%. The gas factor was corrected to normal values of  $90 \text{ m}^3/\text{m}^3$ . Test results showed that with pressure of up to 35 MPa, neither air, gas or  $\text{CO}_2$  effectively forced all petroleum out of the given medium, but flue gas did affect a 15-20% increase in extraction. Enriching the flue gas with carbonic acid increased final yield by 35-40%. Figures 3; references 3 (Russian).  
[64-12131]

UDC 622.243.273(479.24)

#### CONTROLLING SPATIAL DISTORTION IN DRILLING INCLINED WELL HOLES AT MURADKHANLA OIL FIELD

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 83  
pp 15-18

MAMEDBEKOV, O. K., Azerbaijan Institute of Petroleum Chemistry imeni  
M. Azizbekov

[Abstract] Cluster drilling at the Muradkhanla oil field has promoted rapid exploitation using a 2700m column and a 295.5mm drill bit. The present study reports on features of controlling angle of incline through drilling instrument configuration adjustments involving a centering device 2-4m from the drill bit. The azimuth change has been as much as  $3^\circ$  per 100m. Geological, technical and technological factors affecting angle of drilling include horizontal plate structure and hardness variations, but technical problems are generally more problematical for accurate drilling. Cutting efficiency was used to calculate zenith angle and azimuth. Calculations showed that shifting the centering device enhanced control of these parameters. Axial load regulation was another key factor during turbine drilling operations. Zenith angles for various lengths of drill heads are given. Figures 2; references 3 (Russian).  
[64-12131]

UDC 622.243.272

#### BASIC PRINCIPLES OF PLANNING COMPONENTS FOR OPERATOR CONTROL BY SHAFT BENDING IN INCLINED WELL HOLES

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 83  
pp 21-23

MAMEDOV, F. A., Azerbaijan Institute for Petroleum Chemistry imeni  
M. Azizbekov

[Abstract] The growing use of cluster oil well drilling requires improved technology, dependability and procedures for controlling shaft curve in inclined wells. Commonly, lower end shaft components and centering devices are

used for this purpose, but mass production of necessary parts lags behind demand, especially for uniform centering devices that can provide consistent results. At present such devices are custom-made by the drilling enterprises that use them, so that replacements are always different in function, deflection is irregular and zenith angles cannot be predicted. The author recommends use of two centering devices as a minimum to provide better azimuth stabilization. Their design should be based on needed diameters and position on the drilling shaft in order to assure required zenith angles. Figure 1, references 4 (Russian).  
[64-12131]

UDC [658.382.3:622.24].001.5

RESULTS OF SCIENTIFIC RESEARCH AND DESIGN TESTING ACTIVITIES OF ALL-UNION  
SCIENTIFIC RESEARCH INSTITUTE FOR SAFETY TECHNOLOGY IN PETROLEUM INDUSTRY  
IN SAFETY TECHNOLOGY FOR DRILLING DEEP WELLS

Baku AZERBAJDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 83  
pp 27-30, 39

SULEYMANOV, M. M. and KHASAYEV, R. M., All-Union Scientific Research Institute  
for Safety Technology in the Petroleum Industry

[Abstract] The demands for improved safety and working conditions set forth by the 26th CPSU Party Congress call for a new approach, switching to safe techniques of production in deep oil well drilling as in other industrial activities. One key area is the neutralization of hydrogen sulfide both to prevent explosions and to avoid air pollution. Porous iron, ferric chloride and copper, zinc and iron oxides are very slow to react with the pollutant and are subject to temperature and pH factors. The title institute has developed a promising reagent consisting of 65% dry weight manganese dioxide and alkali paste (no more than 5% caustic potassium) with 60% liquid. Tests have shown its effectiveness at a rate of  $0.045\text{--}2\text{kg/m}^3$  without affecting rheological parameters of the drilling solution. Consumption is 3-4 times less than that of imported Ironite sponge, and full neutralization is achieved in 5 minutes in contrast to incomplete neutralization in 30 minutes by the imported product. Other procedures developed at the institute provide for explosion prevention, conservation of drilling solutions and automatic monitoring of hydrogen sulfide in the atmosphere, in drilling solutions and in crude oil produced. Controlling flowing oil and gas wells and cut-off procedures that can be used in case of runaway wells are other interests of the institute. Ferromagnetic particles have been used for the latter purpose. Additives that may be used in water have been identified, and standardized safety norms prepared. References 4 (Russian).  
[64-12131]

## STUDY OF INTERACTION OF PRESSURE AND EXTRACTION WELLS IN PETROLEUM EXTRACTION BY FOAM SYSTEM

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 83  
pp 31-34

MAMEDOV, T. M., Ordzhonikidzeneft Petroleum and Gas Extraction Administration, NASRULLAYEV, I. A. and MAMEDKERIMOV, V. I., Azerbaijan Scientific Research and Design Institute for Petroleum

[Abstract] Systems for forcing petroleum from low-pressure strata include air repression, which dates to the early 1930s, and fringe systems based on hydrocarbon foams using pressure wells to force the petroleum out through extraction wells. The authors discuss this application at the Surakhany oil field, presenting a specific example in an area with numerous tectonic fractures. Calculating the prospects of such an operation is complicated by the need to consider various linear and non-linear differential equations relating to joint gas and liquid filtration. In the given example, a central pressure well and its impact on encircling extraction wells are considered. Their calculations are for a constant ram pressure in an elastic process; with varying ram pressure the Dumel theorem can be applied. Figure 1; references 4 (Russian).  
[64-12131]

UDC 622.276.8

## INCREASING PETROLEUM PREPARATION EFFECTIVENESS

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 83  
pp 36-39

ZARUTSKIY, S. A. and KULAKOV, P. I., North-Caucasus Scientific Research and Design Institute for Petroleum

[Abstract] The "Malgobekneft" Petroleum and Gas Extraction Administration develops mesozoic petroleum deposits at Malgobek-Voznesenskoye, Akhlovo, Severnyy Malgobek and Severnaya Voznesenka, all of which are in late stages of development and are heavily flooded. The physicochemical properties of the respective crude oil of these deposits range from highly stable to moderately stable emulsions, and extraction was done by deep suction or flowing methods. Since all petroleum produced by the Administration is mixed before shipment, the relatively light Malgobek-Voznesenskoye oil affects the emulsion stability of the product: reducing its proportion results in greater stability. In the winter of 1976-77 the authors studied the impact of petroleum temperature on de-emulsifier consumption and petroleum quality. The study was repeated in 1978. It was determined that reducing the oil temperature to 8°C required increased de-emulsifier use to 426 g/ton. At 27-28°C that consumption fell to



110-116 g/ton, and water in the oil was reduced from 10% at 8°C to 2-2.5% at 28°C. Further temperature increases had little effect. Other tests showed that redispersion of water in highly viscous oil produced very stable emulsions. Consequently, technical procedures were developed to prevent water dispersion as far as possible. Figures 3; references 2 (Russian).  
[64-12131]

UDC 621.791.011:539.4.014.1:622.242.422

EXPERIMENTAL STUDY METHODOLOGY FOR USE TENSION IN WELDED ELEMENTS OF  
STATIONARY SEA DRILLING PLATFORMS

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 83  
pp 40-42

KURBANOV, M. F., GADZHIZALOV, M. N., MUSAYEV, R. A. and ISMAYLOV, A. A.,  
State Institute for Planning Maritime Gas and Oil Production

[Abstract] Advances in maritime oil drilling platforms emphasize the need for research in tension, fatigue and other factors affecting welded components of such equipment. Wave, wind and tide pressures, shocks from contact with vessels, elevator operations and drilling vibrations all must be studied in order to assess platform durability. In the present study, load factors at Platform No 1 of the 28 April oil field were evaluated using tensometers that were waterproof and firmly attached to the platform. The protection and signal isolation procedures are described. Sensors were coated with industrial pitch over an epoxy resin-polyisobutylene cover, and each sensor had a separate cable to the central console. The results showed the importance of wind and wave forces as factors in weld durability. Measurement error of  $1 \cdot 10^{-3}$  was regarded to be acceptable, but further improvement of the procedures is recommended. Figures 3; references 3 (Russian).  
[64-12131]

UDC 665.63-103/405

HYDROCARBON COMPOSITION OF PETROLEUM OF 28 APRIL OIL FIELD

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 83  
pp 45-49

ASHUMOV, G. G. (deceased), AGAYEVA, R. M., ALIYEVA, F. Z., IBAD-ZADE, A. D.,  
SULEYMANOV, Sh. Sh. and DZHAFAROVA, R. A., Institute of Petrochemical Production,  
AzSSR Academy of Sciences

[Abstract] The authors studied the hydrocarbon composition of middle and higher fractions of crude from the 28 April oil field, as well as the residue boiling point above 450°C. The tested range of 150-450°C accounted for 60%

of the petroleum, and consisted largely of naphtha-paraffin hydrocarbons whose share in the total decreased from 93% to 36% as the boiling temperature of the fractions increased. In the same way, aromatic hydrocarbons increased from 7% to 28%, n-paraffin content decreased from 18% to 4%, and iso-paraffins and monocyclic naphthenes fell from 62 and 40% to 20 and 16%, respectively. Among aromatic hydrocarbons, alkylbenzenes predominated in all but the 250-300°C range, where naphthalenes were most common, and 400-450°C, where 66% were benzenes, naphthalenes and phenanthrenes. The overall composition was very similar to that of "Surakhan select" petroleum.  
[64-12131]

UDC 665.666.455.3

#### STUDY OF ANTISMOKING PROPERTIES OF ALKYLPHENOLSULFONATES

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 83  
pp 51-53

ALIYEV, Z. E., ALYIEV, S. A., GUSEYNOV, K. Z., BASHAYEV, V. Ye. and  
KHANLAROV, G. G., Institute of Chemical Production, AzSSR Academy of Sciences

[Abstract] Expanding use of diesel engines requires intense efforts to combat emission of toxic pollutants found in diesel fuels. The present study reports on study of the synthesis of alkylphenolsulfonates of alkaline earth metals as antismoking additives for diesel fuel. Three steps in the synthesizing process are described: sulfonation of alkylphenol, neutralization of resulting acids with alkaline earth metal hydroxides, and carbonation with carbonic acid. The resulting compounds mixed well with and remained in suspension in diesel fuels. Their effectiveness was assessed using US Parodine-12 as the standard. The best results were found with calcium, strontium and barium variants, which approached the anti-smoking effectiveness of the US standard and an Azerbaijani counterpart. References 3 (Russian).  
[64-12131]

UDC 338.45:622.276

#### SIGNIFICANCE OF USE LOCATION IN INCREASING EFFECTIVENESS OF NEW TECHNOLOGY UNDER CONDITIONS OF SCIENTIFIC AND TECHNICAL PROGRESS

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 83 pp 54-56

DADASHEV, B. A., GAMBARLY, G. E. and YAKUBOVICH, R. V., Azerbaijan Scientific Research Institute for Petroleum Machinery

[Abstract] Development of new technology, techniques and production management play important roles in advancing the economic effectiveness of the petroleum industry. Design, production and application stages must all be optimized for efficient use of resources and effective equipment innovation. The present

study outlines objectives for such research and development, taking special notice of the region where the equipment will be used. In the present instance, Azerbaijan is the site of intended operations. The Azerbaijan Scientific Research Institute for Petroleum Machinery has worked with local production plants in the design of oil field equipment that would be sufficient for local conditions but free from wasted labor, metal and transportation. An example of waste is the use of large and medium-sized well pumps where only small yields are involved, resulting not only in wasted material for production but generally in hampered production. The desired regionalization of equipment design must be pursued by designers, producers and users alike.

[64-12131]

'NEFTEGAZ-83', SECOND INTERNATIONAL EXHIBITION OF DRILLING AND PUMPING EQUIPMENT FOR PETROLEUM AND GAS WELLS, BAKU, USSR, 6-15 SEPTEMBER 1983

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 10, Oct 83 p 64

[Abstract] The present note reports on the international exhibition "Neftegaz-83" held in Baku 6-15 September 1983 to display equipment for drilling and pumping at both surface and off-shore oil fields. Attendance included 174 firms from 19 countries of Europe, Asia and America. They showed control and measuring devices, gas separation equipment, purification and storage of gas, fire prevention and other hardware. The exhibition resulted in a number of contracts between Soviet and foreign partners for equipment delivery. The need for peaceful conditions in which such commercial arrangements can develop is stressed.

[64-12131]

UDC 665.74:665.637.73

EXPERIENCE GAINED IN MASTERING APPARATUS FOR DEPARAFFINIZATION OF DIESEL FUEL BY MEANS OF AQUEOUS ALCOHOLIC CARBAMIDE SOLUTION

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 11, Nov 83 pp 12-13

ISMAYLOV, A. G., BABAYEV, I. D., GUSEYNOVA, N. K. and GUSEYNOVA, R. A.,  
Institute of Petrochemical Processing imeni Yu. G. Mamedaliyev, AzSSR  
Academy of Sciences

[Abstract] One of the most effective processes for production of high purity paraffins is based on deparaffinization of petroleum products by means of an aqueous alcoholic solution of carbamide. Experience gained since 1981 at the Volgograd Petroleum Processing Plant was reported concerning the process of paraffin purification. Starting with diesel fuels, the methodology used produced material suitable for producing protein-vitamin concentrates.

[89-7813]

## STUDY OF THERMAL STABILITY OF AVIATION LUBRICANTS BY THERMOGRAVIMETRIC ANALYSIS

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 11, Nov 83 pp 18-19

BEDRIK, B. G. and KRICHINSKIY, I. S.

[Abstract] Thermogravimetric analysis was applied to investigate thermal stability of fresh lubricants and those which were used for various periods in real engines. Comparing title data with data obtained from a closed system showed that in open volumes, where the destruction products are continuously removed, maximum permissible temperature of studied oils is at least 50°C lower. In closed systems, the products of the destruction of oil components are not removed and their concentration is increased, eventually leading to a slowing down of the destruction processes. Thermal stability of the oils was determined under conditions of gradually increasing temperature. Synthetic oils had maximum temperature of 225°C, mineral oils, 150°C, and the VT-301 oil was thermally stable up to 300°C. In several oils it was noted that with increase in oil utilization their thermal stability actually increased leading to speculation that the periodicity of oil changes should be reconsidered in favor of longer periods between oil changes. Figures 2; references 4 (Russian, 1 by Western author).

[89-7813]

## EFFECT OF HYDROGEN SULFIDE ON PROPERTIES OF TURBINE OIL

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 11, Nov 83 pp 19-21

GUREYEV, A. A., KHOLODOV, B. P., OSIPOV, S. L., LEGEZIN, N. Ye. and AL'TSHULER, B. N., Moscow Institute of Petrochemistry and Gas Industry imeni I. M. Gubkin; All-Union Scientific Research Institute of Gas

[Abstract] Stability of turbine oil Tp-22 in hydrogen sulfide medium was studied along with a search for effective inhibitors of H<sub>2</sub>S corrosion. It was shown that after prolonged contact with H<sub>2</sub>S, the properties of Tp-22 did not change much with the exception that the sulfur content increased beyond the permissible limits and the lubricating characteristic became poorer. This increase paralleled the duration of contact and the temperature increase. Comparing various inhibitors of H<sub>2</sub>S corrosion, the IFKhANGAZ-1 additive appeared to be the most effective agent. A 0.1% content of this agent provided 95% effective protection of the oil. References 2 (Russian).

[89-7813]

## EVALUATION METHOD FOR OXIDIZABILITY OF AVIATION LUBRICANTS BASED ON KINETIC PARAMETERS

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 11, Nov 83 pp 33-35

BORISOV, V. A., ZAPOROZHSKAYA, O. A. and DENISOV, Ye. T., Central Scientific Research Institute of Aircraft Engine Building imeni P. I. Baranov

[Abstract] Kinetic mechanisms predominating in early stages of the oxidation of synthetic aviation lubricants were investigated; methods were developed for determination of thermooxidative stability based on kinetic parameters. Test samples consisted of commercial bases of synthetic aviation lubricants: diisooctyl ester of sebacic acid (DOS), pentaerythrite ester and a mixture of  $C_5-C_9$  monocarboxylic acids (PE). It was shown that oxidizability of these lubricants was directly related to their base by two parameters: maximum oxidation rate  $v_{max}$  and the time required to reach this maximum rate  $t_{v_{max}}$ .

These two parameters were then used in devising the method for evaluating antioxidative properties of synthetic aviation lubricants. On the basis of this method  $v_{max}$  and  $t_{v_{max}}$  were plotted showing that addition of up to 25% of

PES-7 to PE improved considerably its antioxidative properties. In the interval from 25% to 80% PES-7 there was little additional improvement noticed. Figures 4; references 6 (Russian).

[89-7813]

## RAPID METHODS FOR EVALUATION OF RADIATION STABILITY OF LUBRICANTS

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 11, Nov 83 pp 35-37

DEM'YANOVSKIY, V. B., BARANOV, V. Ya. and PANCHENKOV, G. M., (deceased), Moscow Institute of Petrochemistry and Gas Industry imeni I. M. Gubkin

[Abstract] Radiolysis of the following oils was studied: I-12A, I-20A and MGYe-10A by gas generation, viscosity and index of refraction. A micro-gas meter was used to measure gas generation, a drop micromethod (Frend et al.) gave the most reliable determination of viscosity and an ITR-I type interferometer was applied to determine the index of refraction in evaluating stability of oils towards radiation oxidation. When regression analysis method was applied to experimental data, it was shown that the relationship of gas generation and of the index of refraction to the dose of irradiation was linear. The relationship between viscosity and the radiation dose was described by a second degree regression equation: at low doses the viscosity diminished gradually, but at high doses it increased. Figures 3; references 7: 6 Russian, 1 Western.

[89-7813]

## PHARMACOLOGY AND TOXICOLOGY

### TOXIN-PRODUCING MOLDS IN FOOD DESCRIBED

Riga NAUKA I TEKHNIKA in Russian No 12, Dec 83 pp 11-12

[Article by Rita Teyvane, chief inspector for the use of chemistry in the national economy under the Latvian SSR Ministry of Health: "Do We Know How to Store Food?"]

[Text] Certain molds produce toxins that damage food products and are dangerous to humans.

The Food Program is supposed to improve the supply of food to the population. A great deal has already been done in this direction: great changes have taken place at public eating facilities at major industrial enterprises; scientists are studying the quality of food products.

Health care services are devoting more and more attention to the poisonous products of microscopic fungus, or mycotoxins. Scientists have discovered a whole series of these toxins that are produced by molds growing on food products which have been stored under poor or improper conditions. Of particular concern are the illnesses caused by these toxins, called mycotoxicoses.

Molds are found everywhere. Their useful properties have been utilized for a long time in the preparation of food products and fears about the harmful effects of molds on food have been around for just as long. The first publications on poisoning caused by moldy food appeared back in 1890. The actual cause of the poisoning, however, has been determined only in recent decades. In 1960 in England 100,000 turkeys at one poultry farm died from some unknown illness. Moldy feed was thought to be the cause of the ailment, which was named the turkey x-disease. In 1962 the toxins causing the disease were isolated; the name "aflatoxin" came from the mold *Aspergillus flavus*. Extensive, specially directed research studies began, which resulted in the discovery of a whole series of mycotoxins. In 1970 L. Leyster described 22 different mycotoxins discovered between 1900 and 1970. Included in this group are penicillin (1920), aflatoxins (1960), and nidulotoxins (1970).

Today we know of approximately 240 types of toxigenic fungi and about 60 different toxic substances produced by them; antibiotics, such as penicillin, are not considered true mycotoxins.



Due to the extensive distribution of fungi, toxins can appear in any food products.

Certain mycotoxins have a strong carcinogenic effect (that is, they cause cancer).

The effect of toxins on animals has been studied thoroughly, and one can assume that similar processes take place in the human body.

Do mycotoxins damage the embryo? Do they cause mutations? This is not completely clear. Aflatoxins have been studied in more detail, since they are distinguished from other fungi by the strongest toxic and carcinogenic effects.

In chemical terms, aflatoxins are a mix of four coumarin derivatives that are quite similar. The aflatoxins have been named on the basis of their characteristic fluorescence in ultraviolet light--B<sub>1</sub> and B<sub>2</sub> (blue fluorescence) and G<sub>1</sub> and G<sub>2</sub> (green fluorescence). Starting with B<sub>1</sub>, the toxicity of the aflatoxins increases by 50 percent as one proceeds to G<sub>1</sub>, B<sub>2</sub>, and G<sub>2</sub>.

As a carcinogen, aflatoxin B<sub>1</sub> is 75 times stronger than dimethylnitrosamines; it is 900 times stronger than artificial organic dyes, such as dimethyl aminoazo benzene, or dimethyl yellow (because of its carcinogenic effect, its use in the food industry is now prohibited).

The effect of aflatoxins on animals has been studied relatively thoroughly under experimental conditions. Acute toxicity is manifested primarily by kidney damage, a disruption in nervous system functions, paralysis, convulsions, and loss of balance. Chronic aflatoxicosis results mainly in liver fibroses and tumors; in plants there is a disruption of chlorophyll synthesis and germination. Different animal species react in different ways to aflatoxins: ducklings and rainbow trout are the most sensitive to these toxins.

It is considerably more difficult to evaluate the effect of these toxins on the human body. It has been proved that they damage human tissue cultures.

There are only a few descriptions of cases of acute aflatoxin poisoning in humans and some are still being disputed. There has not been one instance in which the dose of the toxins was clearly established.

Epidemiological research conducted in Africa revealed a connection between the incidence of primary liver cancer and the quantity of aflatoxins in the food.

Aflatoxins have been found in all food substances which have been contaminated with mold under experimental conditions. Among food products that mold rapidly, aflatoxins are found most often in cereals, grain products, and various seeds. These toxins are found particularly frequently in moldy peanuts. It is possible that the composition and structure of peanuts promote the development of the toxins. On the other hand, the problem could also lie in the climate of the countries in which peanuts are grown, since the *Aspergillus flavus* fungus produces toxins at temperatures above 25° C with high humidity.

Even though under ordinary circumstances it is quite unlikely that a human being will be poisoned by aflatoxins, one must consider the possibility that malignant tumors will develop as a result of the body being exposed repeatedly to the toxins even in small doses. The following observation made by Dr. Lindner is of considerable interest: the incidence of primary liver cancer in Denmark is 0.2 per 100,000 people; in the United States, 1.7 per 100,000 people; and among Bantu blacks it is 14 per 100,000 people. The consumption of peanuts is directly proportional to these values.

In the evaluation of food products from a hygienic point of view, a new risk factor has been determined: the indirect threat to human beings presented by aflatoxins in animals. Aflatoxins are found mainly in milk and in the internal organs of animals after slaughter.

Because of the danger of aflatoxins, many countries have set maximum allowable limits for the concentration of toxin B<sub>1</sub> in food products.

In the USSR the determination of aflatoxins has been included in the program for controlling food quality since 1974. Generally, no significant levels of aflatoxins have been discovered, but almost 10 percent of the peanuts tested contained some aflatoxins--between 5 and 1000 µg/kg, with an average value of about 40µg/kg. Peanuts usually start to get moldy not from the outside, but between the kernels, so it is difficult to detect the mold before processing. These peanuts turn black when roasted, so it is easy to sort them out. It is essential that this sorting be done because these peanuts contain high levels of aflatoxins.

In the raw state, up to 0.5 percent of the peanuts can be moldy. It is unrealistic to require that only peanuts not containing aflatoxins be imported, since the exporting countries do not determine aflatoxin levels and mold, and consequently, toxins can form during shipment by sea. Regulations should require that peanuts containing more than 40µg/kg of aflatoxin B<sub>1</sub> should be rejected or processed into oil (toxins are destroyed when fats are refined using an alkaline process). All other efforts to render aflatoxin-containing food products harmless have not provided satisfactory results; either the toxins are not destroyed completely or the products become inedible.

Relatively little has been published on other mycotoxins. Scott, an American mycobiologist, has broken down the most important toxin-producing molds and their toxins as follows:

<u>Mold</u>	<u>Number of toxins formed</u>
Aspergillus	27
Fusarium	9
Paecilomyces	12
Trichothetium	2

In many cases of illnesses caused by fungal toxins, the toxic substances have not been clearly determined up until now. For example, the *Aspergillus ochraceus* fungus found on cereal grains, vegetables, and other food products,

produces ochratoxin A<sub>1</sub>. Its toxicity is only slightly lower than that of aflatoxin B<sub>1</sub>. Its carcinogenic effects are not much weaker either. The *Aspergillus oryzae* fungus found on malt shoots produces a carcinogenic maltorhizoid, which when fed to rats and mice inhibits their growth and eventually causes their death. Islandotoxin is an especially potent poison that causes liver cancer; it is a metabolic product of substances from the *Penicillium islandicum* fungus, which is found most often on rice kernels. The *Penicillium patulum* fungus on meat and meat products produces toxic patulin; *Aspergillus versicolor* is found primarily on cereal grains and it produces sterigmatocystine (coumarin derivative) which is similar to aflatoxins.

Even though these substances are not as toxic, their threat to the health of human beings cannot be minimized, since they are found in a number of food products in significantly larger quantities than are aflatoxins (for example, patulin in meat and sterigmatocystine in flour). The number of newly discovered mycotoxins is growing constantly.

The fact that molds are capable of producing substances that are highly toxic to humans and animals has led to the development of new hygienic evaluation methods for food products that can become moldy.

Of the 100,000 types of mold now known, only 240 produce toxins; but those that are toxin-producing are the most widespread. Therefore, we must deal with the possibility that toxins can be produced in all food products and substances.

If there is visible evidence that a food product has become moldy, there are few people who would go ahead and eat that product. Educational efforts have been successful; depending on the extent of the mold, the affected food product is either destroyed completely or partially (toxins usually penetrate deep into food products, especially in those that are saturated with moisture).

Livestock cannot be fed moldy products carelessly, since toxins harm animals, and then end up in food for human consumption.

The hygienic evaluation of food products manufactured from moldy raw materials is considerably more complex. Control is hindered by the widespread automation of production processes.

Since a certain temperature and humidity are required for all fungi to produce toxins, one of the most important prerequisites is to create a microclimate in produce warehouses that would prevent the development of the necessary temperature and humidity conditions. There should be especially thorough control over raw materials as well.

Physicians should make careful analyses of illnesses in which there is a suspicion of mycotoxicosis. Only through the joint efforts of scientists throughout the world will we be able to determine the causative role of mycotoxins in human illnesses.

Our conclusion: a great deal can be done to ensure proper storage of agricultural products. This approach will contribute to the fulfillment of the Food Program.

We can make the following recommendations:

Do not accumulate inordinately large stocks of food products.

Store flour and grain covered in a dry place, where it cannot be reached by various pests and mold will not grow.

Air out the kitchen often, so that the air does not become humid.

Do not buy more bread than your family will consume.

Store black bread separately from white bread, in a container with two sections.

Carry bread home from the store in a clean plastic wrapper, but do not keep the bread in the plastic for a long period of time.

Store sour cream, milk, and other liquid products in the refrigerator in a covered container; store other semi-prepared products and meat and fish products unwrapped.

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CSO: 1841/111

UDC 615.356:577.164.14].015.4:615.917:[547.262+547.281.2].015.25

EFFECTS OF PANTHOTHENIC ACID DERIVATIVES ON ACUTE ETHANOL AND  
ACETALDEHYDE TOXICITY

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 17, No 11, Nov 83  
(manuscript received 10 Dec 82) pp 1293-1296

MOYSEYENOK, A. G. and DOROFYEV, B. F., Department of Metabolic Regulation,  
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[Abstract] Calcium panthothenate (I) and several of its derivatives (calcium 4'-phosphopanthothenate (II), panthenol (III), panthethine (IV), S-sulfopanthetheine) were tested for their effectiveness in overcoming acute ethanol and acetaldehyde toxicity in albino mice. When administered subcutaneously in a dose of 200 mg/kg I and its derivatives had no effect on ethanol toxicity, but were effective against toxicity due to acetaldehyde administration (with the exception of III and V). The toxicity coefficients ( $LD_{50}/ED_{50}$ ) indicated that IV was four times as effective as I, and II 3.2 times as effective. Although the metabolic mechanisms underlying the therapeutic efficacy of these compounds remains unclear, they obviously involve CoA-based detoxifying reactions. Figures 1; references 18: 13 Russian, 5 Western.  
[97-12172]

UDC 615.213/.214.24.015.4

EFFECTS OF 5-METHYL-1,2-DIHYDRO-3H-1,4-BENZODIAZEPINE-2-ONES ON BINDING OF  $^3H$ -  
DIAZEPAM TO BENZODIAZEPINE RECEPTORS AND THEIR PSYCHOTROPIC EFFECTS

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 17, No 11, Nov 83  
(manuscript received 21 Feb 83) pp 1296-1300

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Physicochemical Institute, Ukrainian SSR Academy of Sciences, Odessa;  
Scientific Research Institute of Pharmacology, USSR Academy of Medical Sciences,  
Moscow

[Abstract] Recent studies have demonstrated that various congeners of benzodiazepines may function as either agonists or antagonists of the parent compound. Using rat-brain synaptosome membranes for binding studies and pharmacologic evaluation on rats of 5-methyl-1,2-dihydro-3H-1,4-benzodiazepine-2-ones revealed that the spectrum of action of these derivatives upon the CNS

is largely determined by substituents at position 7. 5-Methylbenzodiazepinone was found to inhibit GABA-stimulated binding of  $^3\text{H}$ -diazepam to the synaptic membranes and evoked convulsions. The 7-nitro analog has virtually no effect on GABA-stimulation, lacks convulsant properties, but inhibits  $^3\text{H}$ -diazepam binding with an inhibition constant ( $K_i$ ) of 15.2  $\mu\text{M}$  and, therefore, appears to have a greater affinity for the benzodiazepine receptors than the putative endogenous ligands inosine and hypoxanthine. Finally, the 7-bromo derivative was found to possess properties that were intermediate between those of the congeners just considered. Figures 3; references 12: 3 Russian, 9 Western. [97-12172]

UDC 615.33.012.1

#### RECOVERY OF METHYLENE CHLORIDE AND METHANOL AS BYPRODUCTS IN ANTIBIOTIC PRODUCTION

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 17, No 11, Nov 83 (manuscript received 25 Mar 83) pp 1343-1348

TIMOFEYEV, V. S., PAVLENKO, T. G., KHANINA, Ye. P., TORGOVANова, T. V., ZHUKOVSKAYA, S. A., VORONINA, T. M. and KAZAKOVA, V. V., Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov; All-Union Scientific Research Institute of Antibiotics, Moscow

[Abstract] The production of an [un-named] antibiotic is accompanied by the formation of a mixture containing methylene chloride (76.6-84.4 wt%), methanol (11.4-20.3%), 2-ethylhexanoic acid (2.1-3.9%), water (0.3-0.5%) and up to 1% soluble, nonvolatile admixtures (antibiotic, its metabolites, pigments, and other unidentified substances). Several distillation schemes are considered for the recovery of methylene chloride, methanol and 2-ethylhexanoic acid, of which the most promising approach consisted of an initial distillation at 37.4 to 68°C to yield a distillate consisting of 74.3-93.8% methylene chloride, 6-25% methanol, 0.2-0.4% water, and a still residue containing 11-25% 2-ethylhexanoic acid and other components. Subsequent steps involve the separation of methylene chloride from methanol by extraction of the latter with water, continuous distillation to purify methylene chloride, and further distillation to obtain uncontaminated methanol. Figures 4; references 8 (Russian). [97-12172]



EVALUATION OF RADIOCHEMICAL DAMAGE TO POLYMERIC OBJECTS STERILIZED BY  
ELECTRON ACCELERATORS

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 17, No 11, Nov 83  
(manuscript received 18 Aug 83) pp 1354-1359

GORELIK, B. A., SKOROMNOV, I. V., MARGULIS, L. A. and SEMENENKO, E. I.,  
All-Union Scientific Research Institute of Medical Polymers, Moscow

[Abstract] A mathematical analysis was conducted on the factors leading to radiochemical damage of various polymeric objects subjected to sterilization by electron accelerators. The radiation dose responsible for damage can be described as a function of the position of the target and is an integral feature. The effective dose differs from the nominal sterilizing dose by at least 40%, and the position of the target object can be so varied as to minimize radiation damage during sterilization. Figures 3; references 2 (Russian)  
[97-12172]

POLYMERS AND POLYMERIZATION

STORAGE SPACE DOUBLED FOR RAW MATERIAL USED IN POLYPROPYLENE PRODUCTION

Moscow EKONOMICHESKAYA GAZETA in Russian No 43, Oct 83 p 16

[Article: "Capacity Doubled"]

[Text] The working commission has accepted the second section of the liquefied gas warehouse for the existing polypropylene plant. It consists of 12 silver-colored spheres, each 600 cubes ["kuby"--as printed] in size. Now the warehouse can hold twice as much raw materials as before, which will make it possible to stabilize polypropylene production.

The "mechanomontazhnik" [installation workers] brigade of A. Shabardin and section group headed by V. Baygulov at the experimental plant of the "Prommekhanomontazh" [industrial mechanical or machine installation] Trust, as well as the brigade of electricians of Yu. Novichkov from the Chemical Industry Electrical Installation and Wiring ["Khimelektromontazh"] Trust and finishers headed by A. Krysin of the "Khimstroy" [Chemical Plant Construction] Administration, were outstanding in their work on erecting the second section.

10,657

CSO: 1841/59

UDC 678.762.02

CONTINUOUS PROCESS SYNTHESIS OF LOW MOLECULAR WEIGHT POLYSTYRENES WITH  
TERMINAL ALKALI METAL ATOMS

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 2, 1983 pp 75-80

BADALOVA, O. T., EFENDIYEVA, Z. S., KULIYEVA, V. G. and EFENDIYEV, A. A.,  
Institute of Theoretical Problems of Chemical Technology, Azerbaijan SSR  
Academy of Sciences

[Abstract] Technical details are provided on the search for a relatively simple and efficient method for the synthesis of low molecular weight polystyrenes containing terminal alkali metal atoms in the  $\omega$ -position. A successful approach relied on a U-tube reactor with 5.5 mm internal diameter packed with lithium shavings, which allowed the reaction of the monomer with the metal in THF during a flow-through. Evaluation of the various reaction conditions showed that at 0-30°C a yield of 40-300 g/liter·h of the styrene oligomers was possible after a contact time of 6-25 min. Figures 4; references 10: 7 Russian, 3 Western.  
[113-12172]

UDC 537.312.8:678.769

EFFECTS OF WEAK MAGNETIC FIELDS ON MOBILITY OF CHARGE CARRIERS IN  
POLYACETYLENE

Moscow KHIMICHESKAYA FIZIKA in Russian No 12, Dec 83  
(manuscript received 31 Dec 82) pp 1642-1651

FRANKEVICH, Ye. L., KADYROV, D. I., SOKOLIK, I. A. and KOBRYANSKIY, V. M.,  
Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] Studies on the electrical properties of polyacetylene (PA) films have shown that exposure to a weak magnetic field (ca. 100 oe) lowers electrical conductivity by 0.2-0.5% of pure and slightly iodide-doped samples. Increasing the electrical conductivity by several orders of magnitude by doping or cis-trans isomerization diminishes the magnetic field effect several fold. Increasing the electric conductivity of PA by decreasing the temperature or by introduction of additional donor groups (ammonium) increases the effects

of the magnetic field. The magnetic effects on PA were ascribed to altered spin effects on interaction of paramagnetic particle pairs which depressed jump-wise charge mobility. Figures 5; references 20: 5 Russian, 15 Western. [96-12172]

UDC 541.127:539.196.3

#### DEVIATION FROM EQUILIBRIUM DIMERIZATION OF CARBOXYLIC ACIDS IN POLYMERIC MATRIX

Moscow KHIMICHESKAYA FIZIKA in Russian No 12, Dec 83  
(manuscript received 29 Nov 82) pp 1690-1693

GUSAKOVA, G. V., DENISOV, G. S., RECHAPOV, Z. Z., ROGANOVA, Z. A.,  
SMOLYANSKIY, A. L. and SHRAYBER, V. M., Vologda Dairy Institute; Physical  
Institute, Leningrad State University

[Abstract] An evaluation was made of the effects of a polymeric matrix (poly- $\alpha$ -methylstyrene; PMS) on the dimerization of aliphatic carboxylic acids (propionic acid, trimethylacetic acid, adamantane carboxylic acid) in the 90-450°K temperature range by following the intensity of the  $\nu(\text{C=O})$  band at 1740-1750  $\text{cm}^{-1}$  (monomer) and 1700-1710  $\text{cm}^{-1}$  (dimer) on IR spectra. Over the temperature range of 370-450°K the equilibrium constants did not differ from those obtained for a low molecular weight liquid solvent, but at lower temperature changes in the intensity of  $\nu(\text{C=O})$  slow, and, below 280-290°K, stop changing. Therefore, it is evident that at temperature intervals 50-80°K below the glass transition point of PMS the monomer-dimer equilibrium state is essentially frozen. The nature of deviation from the equilibrium depends on the former history of the sample and the conditions under which the temperature is lowered. For example, pre-treatment of the PMS film that had been maintained at a temperature above that of  $\beta$ -transition with liquid nitrogen results in the freezing of a significantly greater quantity of monomers than on slow cooling. Figures 2; references 14: 10 Russian, 4 Western. [96-12172]

UDC 678.742.2-136.744.422

#### COPOLYMERIZATION OF ETHYLENE WITH VINYLACETATE IN FLOW REACTOR EQUIPPED WITH STIRRER

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 83 pp 7-8

TERTERYAN, R. A., IVANOV, V. I. and SHAROV, A. G.

[Abstract] Copolymers of ethylene and vinylacetate (VA) containing 40% VA are widely used in industry as glues, additives to petroleum products in production of films, fillers, etc. In the present study copolymerization was studied under laboratory conditions on continuous process equipment with

recirculating gas. It was shown that with increased content of VA in the reaction mixture, the degree of co-monomer conversion increased along with the index of fluidity of molten copolymers (IFM). Increase of the temperature up to 230°C did not change the linearity of the reaction rate expressed as a function of temperature nor did it affect the logIMF. An increase in VA from 30 to 43% did not change the temperature effect on the yield of polymer. The order of co-polymerization rate of ethylene and VA was 0.39-0.4 with respect to the initiator under conditions studied. Judging from the IFM values, increased content of the initiator led to lower molecular weight of the ethylene-VA copolymers. Figures 2; references 3: 2 Russian, 1 Western. [85-7813]

UDC 541.64:542.952

POLYCYCLOTRIMERIZATION OF OLIGOAMIDO-BIS-(CYANAMIDES) AND PROPERTIES OF POLYMERS FORMED

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 83 pp 11-12

SHUKUROV, G. I., PANKRATOV, V. A., KUTEPOV, D. F. and GODOVANETS, Ye. N.

[Abstract] Polycyclotrimerization of cyanamides leads to the formation of tridimensional polymers with thermally-stable symmetric triazine rings at the junction of structural network. It was of interest to synthesize various polymelamines differing in the interjunctional fragments. The starting materials were oligoamidobis-(cyanamides) and the polycyclotrimerization was carried out in evacuated, sealed ampules at 310°C in presence of Lewis acids. The effect of temperature, of reaction time and of pressure on this process was studied. High thermal stability, excellent physical-mechanical and electro-insulating properties as well as availability of the starting materials assured wide applicability of the melamines obtained. Figure 1; references 3 (Russian). [85-7813]

UDC 678.5-416.046.83

ANTISTATIC PROPERTIES OF DECORATIVE-SEPARATION POLYMER FILMS

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 83 pp 15-16

KISLYAKOVA, V. I., DRUYAN, I. S., GUDIMOV, M. M. and SEREGINA, L. S.

[Abstract] All of the currently-used plastic panels are dielectrics which accumulate static electricity on their surfaces because of their low hydroscopicity and electroconductivity. The goal of the present work was to find ways of improving antistatic properties of these panels by treating their surfaces with a variety of surface-active agents. A high antistatic effect could be achieved by treating the panel surface with 2.5% solution of alkamone

DS and carbozoline SPD-3. A lesser effect was also achieved with a 2% solution of "Charodeyka" or "Antistatik". The application method or changes in the concentration of the antistatic agent had no effect on the end result. To preserve antistatic properties, it was recommended that the panel surfaces be wiped periodically with 2-2.5% solution of Alkamon-DS.  
[85-7813]

UDC 678.743.4.01:66.085.3

#### EFFECT OF $\gamma$ -RADIATION ON PROPERTIES OF FLUOROPLASTIC F-2M

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 83 pp 16-18

KHANKIN, Yu. V., LYASHEVICH, V. V. and YEGOROV, B. N.

[Abstract] Behavior of the fluoroplastic F-2M was studied under exposure to radiation with limited access of air. In addition, properties of F-2M and F-4 plastics were compared. Powder sample of F-2M plastic underwent a destructive process paralleling the radiation dose, as evidenced by increased solubility in dimethylformamide and by absence of gel fraction. Geometric dimensions of the test sample, limiting the access of air oxygen to the sample body played a principal role in these destructive processes of the molded material. F-2M plastic actually increased its strength when exposed to radiation; in general it surpassed the F-4 specimen 50-fold in respect to the radiation stability. Under conditions of limited oxygen supply, structuralization processes appeared to predominate. Figures 2; references 8: 7 Russian (1 by Western author), 1 Western.  
[85-7813]

UDC 678.673'41'5:536.5:54.171.002.637

#### EFFECT OF ADMIXTURES ON THERMAL STABILITY OF POLYCARBONATE

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 83 pp 18-19

SILING, M. I., LEVANTOVSKAYA, I. I., AMERIK, V. V., SHKARPEYKINA, G. A. and DRALYUK, G. V.

[Abstract] Total and relative effect of impurities on thermal stability of polycarbonate polymer was studied, measuring light transmission and molecular weight of the test samples containing various levels of the following admixtures: iron, phenol, diphenylpropane, triethylamine, diphenyl carbonate and NaCl. It was shown that the most undesirable impurity in the final product was iron, followed by diphenylpropane, phenol, diphenyl carbonate, all of which could participate in ionic type destructive processes along the carbonate bonds. NaCl, which catalyzed these reactions, was also found to be undesirable. References 4 (Russian).  
[85-7813]



## ANTIFRICTIONAL PROPERTIES OF SOME THERMOPLASTICS CONTAINING CARBON FILLERS

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 83 pp 21-23

MOLCHANOV, B. I., KOTOMIN, S. V., BURYA, A. I. and ZAKHAROV, A. V.

[Abstract] The relationship between the degree of filling of a phenylone (aromatic polyamide) with carbon fiber and its wear resistance was investigated. Experimental results showed that an increase of carbon fibers in phenylone up to 15% led to a 10-fold decrease of polymer wear. This phenomenon held up to pressures of 3.2 MPa; when this pressure was exceeded, the coefficients of static and dynamic friction increased sharply. One of the deficiencies of phenylon concerned the technology of its processing: high pressure and high temperatures are required for it, along with specialized equipment. Therefore, the study was extended to aliphatic polyamides which have not found much of an application in the technological field due to poor resistance to acids and bases. It was established that polypropylene, which showed a comparable friction coefficient with polyamides, exceeded their wear resistance 2-3 fold, when it was filled with 20% of carbon fibers. In this composition it could be used in equipment designed for chemical plants. References 3 (Russian).

[85-7813]

## DEVELOPMENT OF DIELECTRIC INSULATORS

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 83 pp 23-25

TURKOVA, N. N. and BORIN, V. N.

[Abstract] To increase the durability of insulating joints on eleqas equipment (equipment insulated with compressed  $\text{SF}_6$  gas), it was proposed to deposit insulating polymer covers on metallic screens. This would change many processes occurring in the system and for this reason various polymer compositions were studied in this application. Experiments showed that the period of charge flow is not affected by the polymer thickness but depends on its dielectric properties. Lowering the  $\rho_v$  value of the polymers by adding carbon black facilitates formation and development of the charge along the surface of the polymer cover. Full-scale experiments are needed to determine various parameters of dielectric covers which would lead to self-regenerating insulation during discharge in the gas gap "screen-grounded frame". Figures 2; references 7: 3 Russian, 4 Western.

[85-7813]

## CHEMICAL STRUCTURE AND ADHESIVE PROPERTIES OF POLYAMIDES

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 83 pp 27-28

ZADOYA, M. A. and PAVLOVA, A. Ye.

[Abstract] The adhesive strength of copolyamides was studied as a function of their chemical structure. It was shown that a decrease in free amide groups from 14 to 11.5% leads to considerable drop of adhesive strength (more than a three-fold drop) without significantly affecting the cohesiveness of the adhesives. An increase in the hydrocarbon chain between the functional groups of amidoforming components resulted in a drop of free amide bonds and in further reduction of the adhesive strength. Thus, the adhesive strength of polyamide compounds can be varied by proper selection of the chemical composition of copolyamides. Figure 1; references 3 (Russian).  
[85-7813]

## EFFECT OF ABSORBED IRRADIATION DOSE STRENGTH ON POSTRADIATION CHANGES IN VOLUME RESISTANCE OF POLYMER DIELECTRICS

Moscow PLASTICHESKIYE MASSY in Russian No 11,, Nov 83 pp 31-33

MAKEYEV, S. N. and FILATOV, N. I.

[Abstract] Changes in specific volume electric resistance ( $\rho_v$ ) of high pressure polyethylene (HPPE), polytetrafluoroethylene (PTFE) and polyimide with varying thicknesses were studied in relationship to the dose of continuous  $^{60}\text{Co}$   $\gamma$ -irradiation. Postradiation changes in  $\rho_v$  of HPPE depended on the interval between radiation and the determination of  $\rho_v$ . Samples of PTFE showed no relationship between postirradiation  $\rho_v$  and the dose increase up to about  $2.6 \times 10^2 \text{ kI/kg}$ . Further dose increase resulted in doubling of the aging rate and quadrupling the coefficient D (Absorbed threshold dose). Polyimide is the most stable material against the action of  $\gamma$ -irradiation. From the three test samples studied, PTFE was most sensitive to radiation oxidation. Overall, the  $\rho_v$  changes in all test materials depended on the exposure dose and on the thickness of the specimens. Radiation electroconductivity during continuous  $\gamma$ -irradiation depended on previous exposure to irradiation. Figures 3; references 6 (Russian).  
[85-7813]

HEAT AGING AND LONGEVITY OF LOADED MULTILAYERED, WELDED FILM MATERIALS  
OF 2ML-PE-2ML-PE BRAND

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 83 pp 35-38

MATIKOV, G. A., MATSYUK, L. N., KRYUKOV, M. S. and VISHNEVSKAYA, N. V.

[Abstract] Heat aging and longevity of polylayered films were studied. The test material was four layered composite consisting of alternating film layers of polyethylene (PE) and polyethyleneterephthalate plated on both sides. Two methods of seam forming were used: overlapping and T-shaped. The behavior of the finished materials appeared to differ along the type of seams used. Whereas the overlapping seamed materials were de composed only near the seam, along the composite, the T-shaped seams experienced splitting and tearing off of the PE cover. On storage, the overlapping seam products retained their strength, while those with the T-shaped seams diminished 2-fold in their strength. In general, a recommendation was made to use overlapping welding compounds with welded edges. Figures 3; references 8 (Russian, 1 by Western author).  
[85-7813]

## HYDROLYTIC LIGNIN AS FILLER FOR CARBAMIDE FOAM PLASTICS

Moscow PLASTICHESKIYE MASSY in Russian No 11, Nov 83 pp 44-46

LEONOVICH, A. A., BELOV, Yu. N. and DOVYDENKO, T. I.

[Abstract] In an attempt to increase the strength and to decrease the shrinkage of carbamidoformaldehyde foam plastic, hydrolyzed lignin was used as a filler. It was shown that the foam plastic with lignin had an apparent density of 200-300 Kg/m<sup>3</sup> and compression breaking point of 0.7 MPa. Combustibility and smoke production of this product could be improved by treating hydrolyzed lignin with a condensation product of phosphoric acid and carbamide. Treatment with this combination did not change any of the basic properties of the foam plastic. Figure 1; references 3 (Russian).  
[85-7813]

## RUBBER AND ELASTOMERS

### NIZHNEKAMSK PETROCHEMICAL CENTER

Moscow EKONOMICHESKAYA GAZETA in Russian No 47, Nov 83 p 16

[Unsigned article]

[Text] The Nizhneskamsk Industrial Center in the Tatar ASSR is a large petrochemical complex. It includes 11 enterprises composed of synthetic-rubber plants, petroleum product plants, a tire plant, and food industry plants; under construction is an industrial charcoal plant and a number of other facilities. Enterprises based on oil refining produce isoprene rubber, ethylene, propylene, benzene, ethylbenzene, other petrochemical products, and large numbers of general-purpose and truck tires for VAZ and KamAZ vehicles.

All the enterprises and related facilities have been built in full accordance with project decisions taken in the approved scheme of the industrial center's master plan. Utilized in their construction were new components and techniques of organizing the work: cast-in-place piles under the trestle footings, enlarged installation of the vertical apparatus columns weighing up to 700 tons, and so on. Effective measures have been implemented in the enterprises to protect against air pollution.

Specialists of Gipprokauchuk, Goskhimproyekt, Nizhnekamskneftekhim Association, Tatenergostroy Administration, and a number of other organizations have been awarded 1983 USSR Council of Ministers prizes for creating the center.

12255

CSO: 1841/115

STUDY OF PROCESS OF PLATINUM CATALYST POISONING DURING LIQUID-PHASE  
HYDROGENATION UNDER PRESSURE OF HYDROGEN

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 11, Nov 83  
(manuscript received 11 Mar 82) pp 2460-2463

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[Abstract] Effect of metallic mercury, unithiol and pyridine on liquid-phase hydrogenation of phenylacetylene up to ethylbenzine on a platinum coated catalyst at 5 atomic percent Pt/BaSO<sub>4</sub> under hydrogen pressure of 1.51 MPa was studied. Typical contact poisons were used as additives. At atmospheric pressure, the hydrogenation rate decreased insignificantly without change of the form of the kinetic curve or the selectivity of the process. At increased hydrogen pressure, pyridine reduced the rate of the process considerably; the selectivity increased by 2 percent and the shape of the kinetic curve remained unchanged. At atmospheric pressure, increase of mercury content reduced catalytic activity with preservation of the shape of the kinetic curve, indicating the absence of selective effect of mercury. At 1.51 MPa, mercury had no poisoning effect on the catalyst and the rate of reaction did not depend on the mercury content; its presence did not change the shape of the kinetic curve nor increase selectivity of the process. Under these conditions, there was significant hydrogen displacement from the catalyst surface and reduction of its overall surface. At atmospheric pressure, unithiol increased the selectivity of the process. The rate of saturation of the triple bond was not decreased but hydrogenation of the ethylene bond dropped. Small amounts (0.001 g) of this poison had some promoting action on the catalyst. At hydrogen pressure of 1.51 MPa, there was no increase in selectivity of the process nor increase in reaction rate in the presence of unithiol. The common feature in the effect of these poisons at atmospheric pressure and high pressure is the quantity of poison in relation to the weight of catalyst which is required to achieve noticeable poisoning (unithiol 0.0020, mercury 16.0000 pyridine 6.0000 g/1.0000 g of catalyst). Figures 2; references 8:

5 Russian, 3 Western.

[102-2791

## ELECTRODIALYSIS OF WASH WATERS AFTER FIXING PHOTOGRAPHIC FILM

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 11, Nov 83  
(manuscript received 24 Dec 81) pp 2487-2491

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[Abstract] Laboratory data concerning the prospects and some characteristics of the process of electrodialysis of silver-containing wash waters after fixing film are presented and discussed, with data concerning the change of properties of ionite membranes during this procedure used to predict the duration of their operation in such solutions. It was found that electrodialysis may be used to desalt these wash waters. A current density above  $32 \text{ A/m}^2$  was required to produce a concentration of the standard fixing solution. The degree of concentration of silver in the brine increased in direct proportion to the current density. The wash water could be desalted to a level at which it could be reused for washing film. The MK-40 cationite membrane was superior to the MA-40 anionite membranes used in the experiments. The laboratory electrodialysis device used in the study is illustrated and described. Figures 3; references 10: 5 Russian, 5 Western.  
[102-2791]

UDC 628.337:541.138.2

## STUDY OF ELECTROCHEMICAL OXIDATION OF TRILON B

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 56, No 11, Nov 83  
(manuscript received 14 Apr 82) pp 2543-2547

MUSAKIN, D. A., OLEYNIK, M. S., SHUYSKIY, D. B. and DEMENT'YEV, A. G., All-Union Design and Scientific Research Institute of Complex Energy Technology

[Abstract] The influence of such factors as the design of the electrolyzer, the composition of the solution and the pH of the medium on effectiveness of electrochemical oxidation of a sodium salt of Trilon B is described and discussed. It was found that it is economically advisable to carry out oxidation in an electrolyzer with a diaphragm from a cation-exchange membrane at pH values of the initial solution from 5 to 11. Specific energy expenditures on oxidation are reduced with an increase of the Trilon B concentration. Figures 4; references 5 (Russian).  
[102-2791]



RECOVERY OF ARSENIC FROM THERMAL WATERS

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 2, 1983 pp 104-108

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[Abstract] Several absorbents were tested for the feasibility of recovery of arsenic from Daggydag thermal waters under different conditions of temperature and pH. Maximum recovery (84.9%) was obtained with aluminosilicate at pH 4.2. Perlite and lomonosovite were less efficient in the recovery of arsenic, showing a maximum at pH 12.7-12.9. The adsorbed arsenic was fully eluted from the alumino-silicate by washing the latter with 1-5% aqueous alkaline solutions. Figures 1; references 5 (Russian).

[113-12172]

REGENERATION OF SELENIUM FROM ALKALINE SOLUTIONS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 53, No 12, Dec 83  
(manuscript received 14 Jul 82) pp 2733-2737

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[Abstract] In the preparation of selenourea, an undesirable product,  $H_2Se$  is formed which is an environmental pollutant. The  $H_2Se$  is absorbed in an alkaline solution (KOH). The present work deals with regeneration of potassium selenide solutions by oxidation with air oxygen, in order to recover the selenium and to recycle it into the synthetic process for selenourea. This process appears to go in three stages: at first, no regeneration of selenium is observed, but the temperature of the solution increases rapidly; when it peaks, a second phase sets in and selenium content in the solution begins to fall while oxidized selenium precipitates; the color of the solution becomes weaker almost to total disappearance. During the final stage, selenium concentration in the solution begins to rise again, and in those cases where KOH is present in excess of 15%, the color reappears. It was shown possible, in principle, to recover selenium from production effluent and to recycle it into the technological process. Figures 2; references 7 (Russian).  
[129-7813]

CSO: 1841

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